For Men Who Manage MARCH 1957

chemical processing

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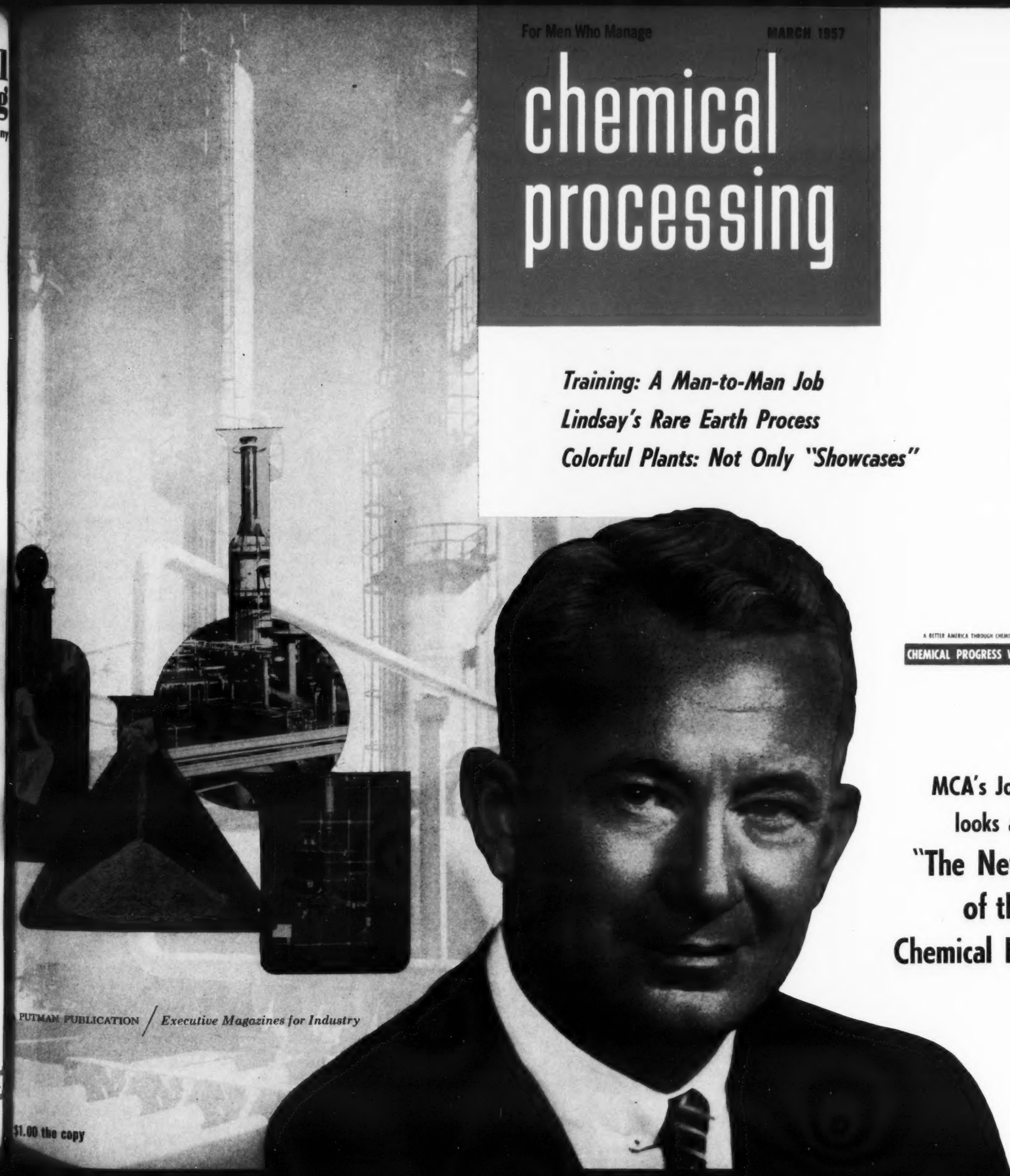

A BETTER AMERICA THROUGH CHEMISTRY
CHEMICAL PROGRESS WEEK April 8-12

MCA's John Gillis looks at . . .

"The New Face of the Chemical Industry"

page 10

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GENERAL CHEMICAL ANNOUNCES

NEW LIQUID ALUM FACILITIES AT PORT ST. JOE, FLORIDA

General Chemical's new liquid aluminum sulfate plant at Port St. Joe, Florida, is one more example of how the Company keeps pace with alum and other basic chemical requirements of American industry year after year.

With it, General will now have 24 facilities across the country, producing dry or liquid alum. All are conveniently located in major consuming areas. Together they form a network geared to serve your alum needs—whether you operate one plant or several—anywhere on the map.

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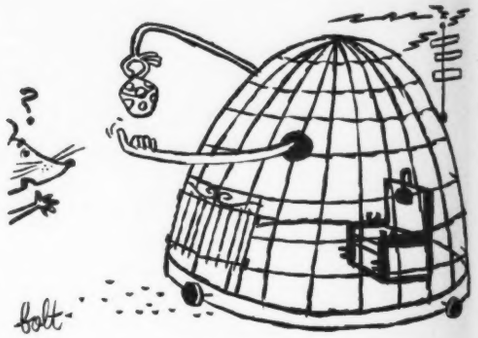
THAT'S INTERESTING



Build a better mousetrap

A thin, electrically-conductive, metal film sprayed onto high-impact polystyrene is heart of "The Electronic Cat", a plastic device that electrocutes up to five mice without resetting. Trap consists of plastic dome-shaped cage with a floor, both coated inside with a zinc film that conducts electricity.

Interior of cage is connected to one current pole, floor surface to another. Mouse crawls into a hole in top of cage seeking bait placed inside. Standing on floor, he soon touches interior of case, completing the circuit and electrocuting himself. Trap and process for spraying conductor onto plastic were developed by William C. P. Zabel, president of Admiration Plastics Co.

Next, self-peeling bananas?

No push, pull, press, twist, or snap is needed in the "Parker 61" that fills itself. Just take off the barrel and dip inner cell into ink. In ten seconds pen takes in enough ink to write more than 7,000 words.

Inside the barrel is a patented cell 2" long and 0.280" in diameter of carefully spaced foil. It is fashioned of sheeting only 0.0010" thick that is rolled to form a series of parallel capillary tubes. The ink rises to the top of the tubes by capillary action and the pen fills itself. Provisions are made to maintain correct pressure in the tubes and to cope with variations in temperature and pressure to prevent leaks.

Test tube for smog

Giant test tubes, two 2200 sq-ft sections of a converted greenhouse, are being used by Midwest Research Institute to study the contribution of the automobile to smog formation. Glass floor, walls, and roof permit two experiments simultaneously, at same light exposure, with same or different intensities of smog. Numerous analytical instruments follow changes in chemical concentrations during smog formation. Panels of college students enter chambers to provide a measure of eye irritation.

(*Please turn to page* 231)

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 20 March 1957 No. 3

CHEMICAL PROCESSING Magazine serves American industry wherever chemicals and chemical processes are involved.

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Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

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National Business Publications, Inc.
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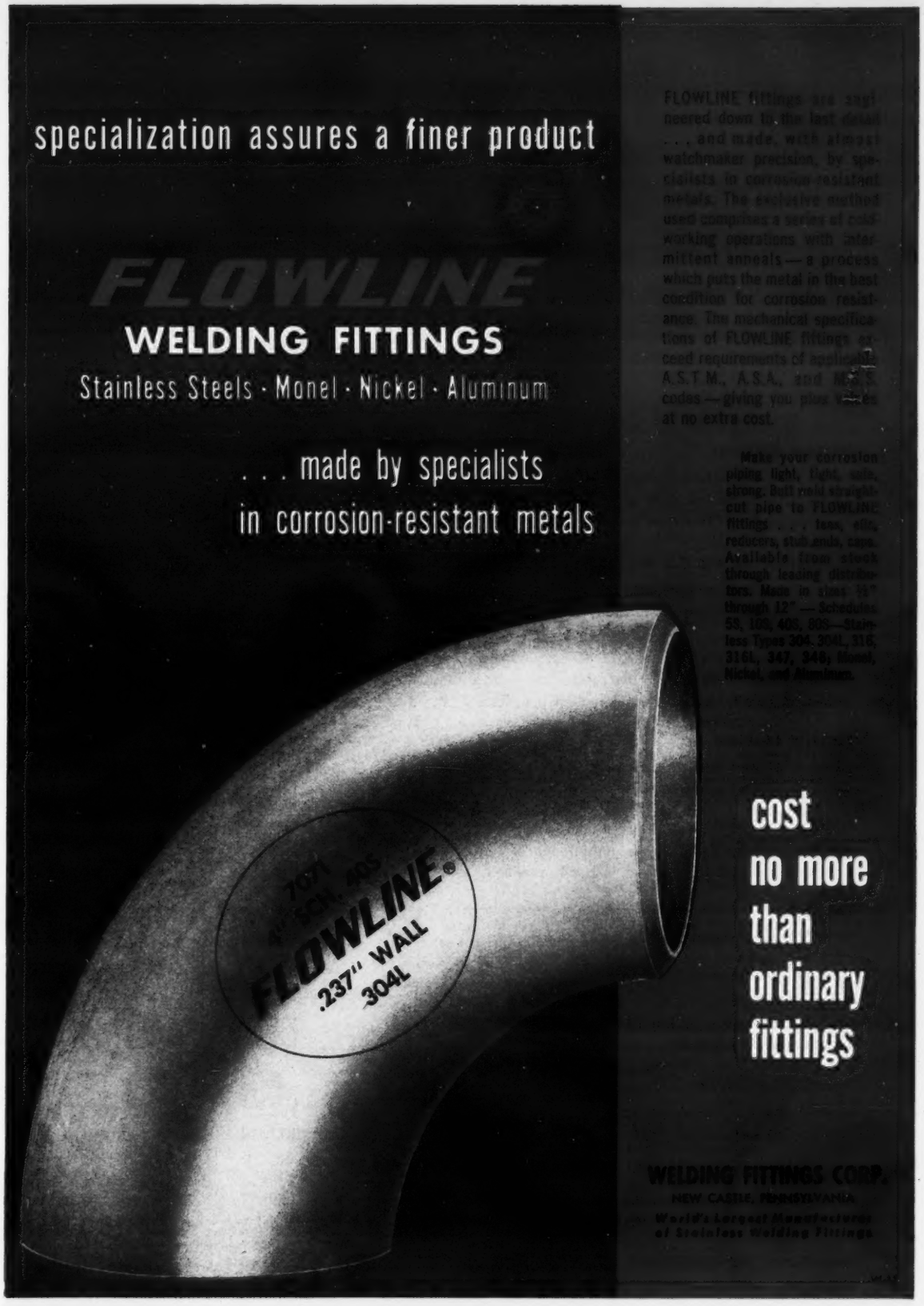

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chemical processing

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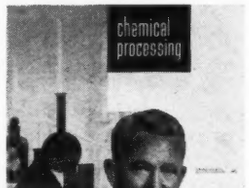
THIS MONTH'S COVER



John Gillis, MCA Board Chairman and a Vice President at Monsanto, is shown alongside the industry that he represents and discusses on page 10 of this issue. "Progress . . . and the New Face of the Chemical Industry" describes the changing boundaries of the chemical industry . . . and the ever-growing challenges and opportunities within the field.

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over the editor's shoulder

Opening the door to the future

Things are happening fast in the nuclear field. Now that the initial roadblocks have been removed almost everybody seems to be entering or considering some phase of the field. Research reactors are popping up like mushrooms, nuclear power plants have gone into operation, and the Nautilus has shown that a propulsion reactor in the family car isn't just a fanciful dream.

During a recent visit to the US Atomic Energy Commission in Washington, D. C., we were told that there are now over 1120 industrial firms using radioactive isotopes in their work. We were also informed that the Commission has granted more than 1100 permits giving organizations access to classified information of industrial interest.

CHEMICAL PROCESSING is one of these permit holders. Although the material available under this program cannot be published, it has several useful purposes. It serves as valuable background information, tells us what's going on behind the scenes, and gives us a good idea on what (and where) to look for future stories.

In addition to the above, our editors have been attending the important atomic shows and expositions.

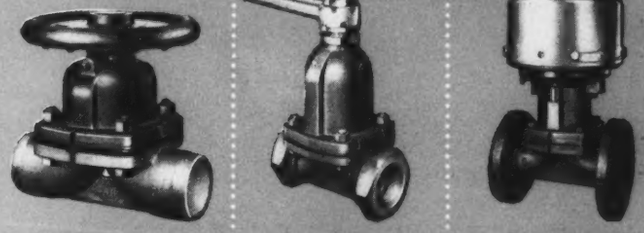
This all adds up to one thing: better service for our readers. If you have been a regular reader of our Ideas section, you have been kept informed of the significant developments in the nuclear field . . . especially as they pertain to the chemical processing end of the business. This coverage will continue, and will expand as the field grows.

Ted F. Merchant

Associate Editor

ALL-PURPOSE VALVE

for handling materials as diversified as corrosive fluids, gases, beverages, viscous materials, foods, compressed air, solids in suspension.



Grinnell-Saunders Diaphragm Valve

Unsurpassed on lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

In industries as varied as mining, food, textile, pulp and paper, beverage, water and sewage, chemicals . . . Grinnell-Saunders Diaphragm Valves continue to win enthusiastic acceptance. The unique design of the valve — with its flexible, long-wearing, tight-closing diaphragm — offers many unusual advantages.

If you have a valve problem, it will pay you to write Grinnell for further information.

Choice of Materials

Bodies — iron; cast steel; stainless steel; Durimet 20; Hastelloy A, B, C; bronze; Monel; aluminum; PVC (polyvinyl chloride); Saran

Body linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; bronze; other materials on special order

Choice of Bodies

Conventional weir type

Straight bodies — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle bodies — screwed; flanged; socket weld

Other types

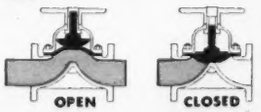
A line of Straightway Valves (for straight-thru flow) and Full-Bore Valves (for ball brush cleaning) also are available

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

Operating Features

- diaphragm absolutely isolates bonnet mechanism from the fluid in the line
- diaphragm lifts high for streamline flow in either direction
- diaphragm presses tight for positive closure
- simple maintenance — diaphragm easily replaced without removing valve body from line



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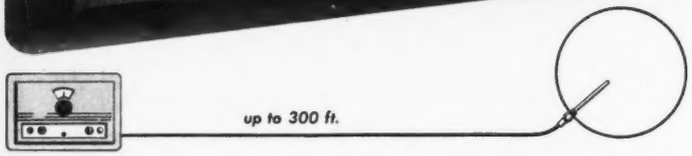


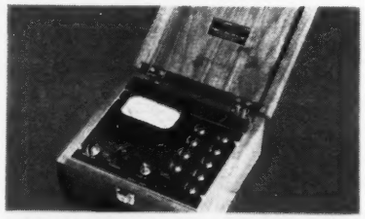
REMOTE TEMPERATURE CONTROLLER

Sensitive to ±.1°C. within range of −65° to +115°C.

When you must maintain close control over the temperature of a substance located at some distance from your base of operations, the ideal instrument is the Bendix* Remote Temperature Controller. Designed for either laboratory or industrial use, the Controller will automatically maintain temperatures within one-tenth degree C. of the desired setting. Highly sensitive and ruggedly constructed, it is equipped with a temperature-sensing thermistor probe which will operate as much as several hundred feet from the Controller itself. This permits maintenance of temperature control over substances stored far from the centrally located control unit.

On-off control is automatic. If the temperature of the remote probe varies from the value set on the Controller's dial, the unit automatically activates cooling or heating equipment to correct the variation.

If you must maintain constant temperatures in substances some distance from your normal working location, you need the Bendix-Friez Remote Temperature Controller. For complete operating information, write Bendix-Friez, 1450 Taylor Ave., Baltimore 4, Maryland.



PORTABLE REMOTE TEMPERATURE INDICATOR This unit will give you immediate temperature readings at as many as nine different probe locations. Saves cost of nine permanently installed temperature indicators. It operates at the flick of a switch and is effective at distances up to several thousand feet.

*REG. U.S. PAT. OFF.

Friez Instrument Division

Bendix AVIATION CORPORATION

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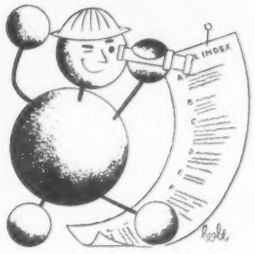
looking ahead to next month . . .



Featured next month . . . chemical materials

The chemical industry is developing new chemical materials at the rate of about three every other day. Next month's CHEMICAL PROCESSING features chemical materials, and we're listing over 500 new chemical products introduced during 1956 . . . indexed by *uses*. If you're looking for the solution to one of your materials problems, just look up the category and check each of the chemicals referred to by number. Manufacturer's names and addresses are also given . . . no need to look for some easily misplaced directory to find them.

Other highlights . . .

F. S. Swackhamer, President of the Commercial Chemical Development Association and Manager of Sales Development, Shell Chemical Corp., debunks the sacred cow of research per se. Especially timely in this period of economic uncertainty, Swackhamer says we must take a long look at the real importance of research — offers succinct suggestions for really making it pay off.

A Chemical Materials feature story tells about a promising new series of chemicals that are just now emerging into commercial-scale production . . . high-purity, straight-chain alpha and iso olefins.

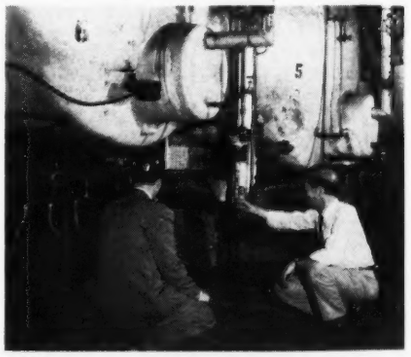
Made from animal and vegetable sources, they offer a number of properties heretofore unobtainable from petroleum olefins. Very reactive chemically, they should find big uses in petroleum, textiles, adhesives, paper, plastics and rubber, leather, and coatings.

There'll be four helpful nomographs in the featured section, slanted toward chemicals.

Accurate temperature control for resin distillation

Distilling non-reactives and solvents out of coumarone-type resins at Pennsylvania Industrial Chemical Corporation, Clairton, Pa., requires temperature of 250°C. Heating with steam would require a pressure of over 400 psi. And hot oil heating was not flexible enough for fluctuating load requirements of the system.

PICCO settled on electrical immersion heating to obtain the necessary temperatures while maintaining desired flexibility of available heat.



CP editor Ted Wett (left) and William D. Johnston Jr. inspect immersion heater installation at Pennsylvania Industrial Chemical

Assistant Editor Ted Wett visited PICCO's Chief Engineer, William D. Johnston Jr., to obtain the data and photos. The story of PICCO's heating problem — and solution — is in April's New Solutions section.

Fluorinated refrigerants by French process

When Pennsalt recently decided to go into the refrigerant and aerosol propellant business, they found a number of reasons for choosing the French Electro-Chimie process for producing the fluorinated hydrocarbons. Formulations can easily be changed as market conditions dictate, and the process

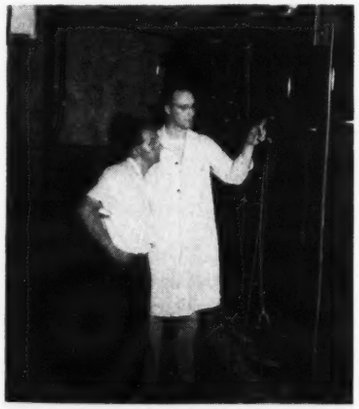
Here's a quick preview
of features you'll find
in April CHEMICAL PROCESSING

Associate Editor Gordon Weyermuller greets H. M. Fisher, Technical Adviser at Pennsalt, as he visits the company's new fluorinated hydrocarbon operation

doesn't call for extremely high pressures or severely corrosive conditions.

Associate Editor Gordon Weyermuller made a trip to Calvert City to learn about the process, talked to Pennsalt's E. V. Winslow, Project Manager.

For details of the process' advantages, see next month's New Solutions section.

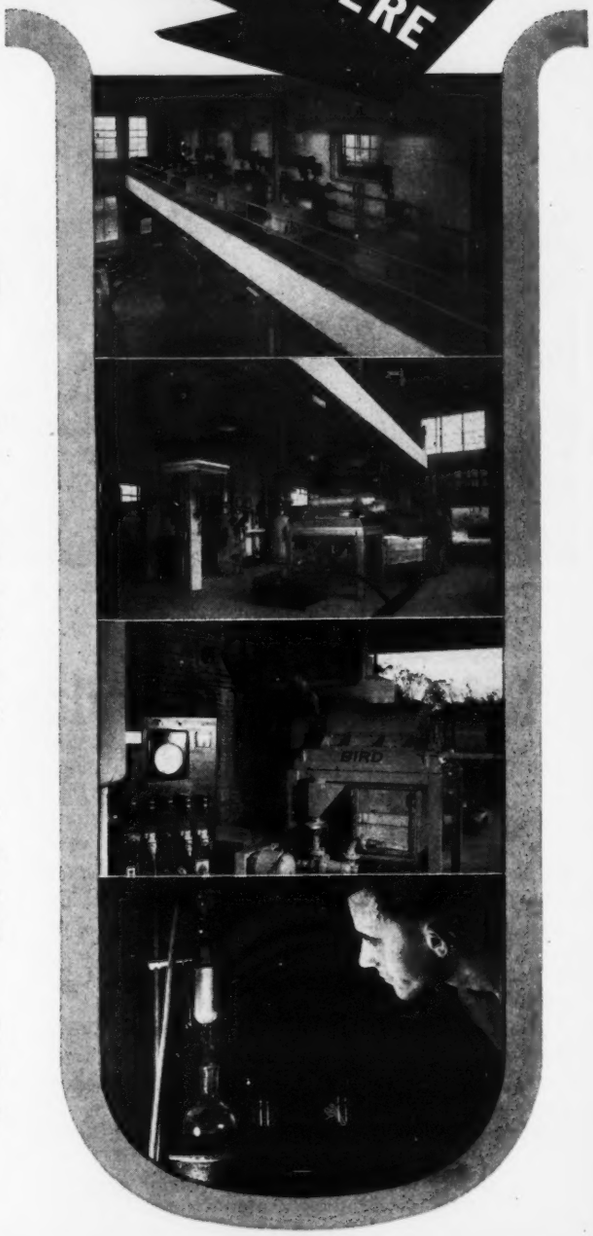


Dean Browne (right) and CP's Ted Meinhold inspect ion exchange columns at Lindsay's rare earth operation

Oops!

In this column last month, Lindsay Chemical's Dean Browne was incorrectly identified in the photo caption as Dr. Howard Kremers. Here's the photo again, this time captioned correctly. The story of Lindsay's rare earth operation is on page 12 of this issue.

MAKE YOUR FILTRATION TESTS HERE



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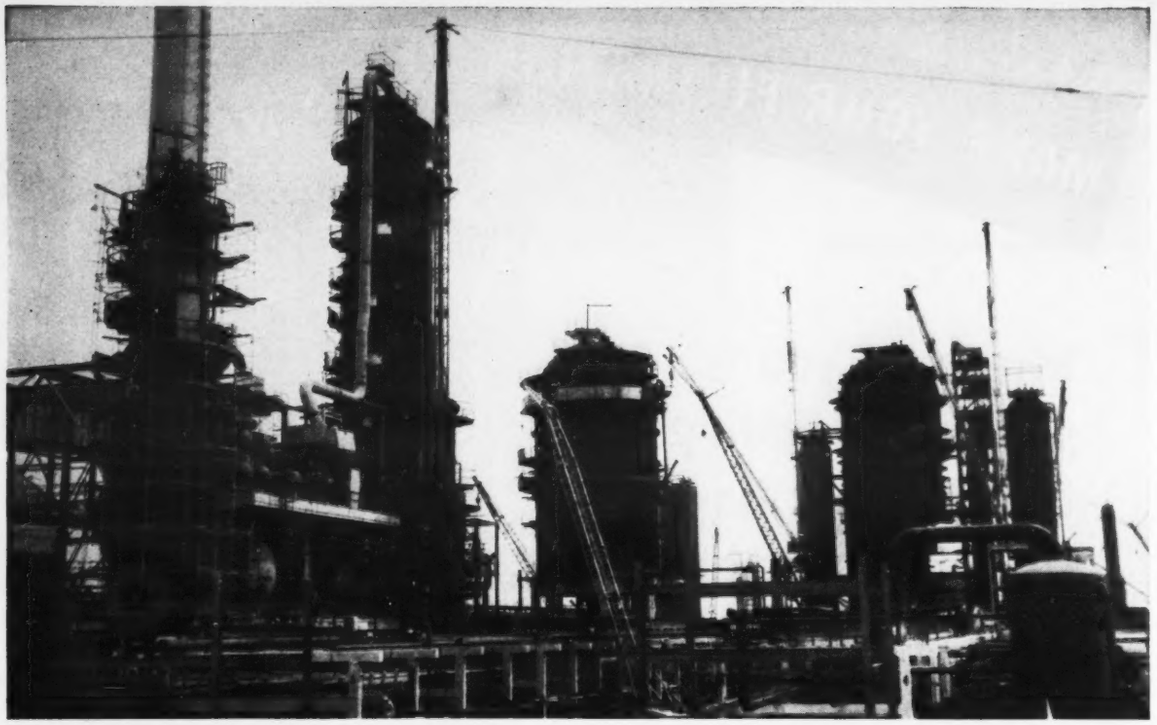

A dozen vessels built by Newport News were furnished under contract with C. F. Braun, Inc., of Alhambra, Calif., design engineers for the ultra-modern Delaware Flying A Refinery of the Tidewater Oil Company located 15 miles south of Wilmington.

Newport News builds 12 major components for new Flying A 130,000-bpd refinery

This is the new Tidewater Delaware Flying A Refinery now under construction near Wilmington.

Newport News fabricated 12 of its major vessels — 2 of which are the largest such units ever built: a 250′ Orthoflow fluid "cat cracker" converter and a 225′ reactor scrubber of the fluid coker.

More notable than size, though, is the quality of the Newport News fabrication.

Coke-out screens in the reactor scrubber, for example, are made of 704 12% chromium segments. Welded together with accuracy, they provide 45% clear opening . . . with opening tolerances less than 1%.

You get expert fabrication, the skill of specialists when Newport News builds your equipment. When you want reactors, pressure vessels, vacuum tanks and the like, sub assemblies or weldments in almost any size or shape, get a bid from Newport News.

Send for newly published, easy-to-read, illustrated booklet, "Facilities and Products". It describes the many ways in which Newport News can help you with present or future projects. Write for your copy today.

Full advantage was taken of the Newport News deep water loading facilities for transportation of all of the equipment by barge. Shop erection prior to shipment assured fast, trouble-free field assembly.

Engineers: Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia

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Mr. Gaston was graduated from Princeton University in 1928 and Harvard Law School in 1931. After an association with the law firm of Wickersham & Taft in New York City, he became Assistant Corporation Counsel of the City of New York in 1935.

In 1936 he joined Allied Chemical & Dye's Legal Division and in 1941 he became Assistant to Regional Manager of Allied's Ohio River Ordnance Works and Buckeye Ordnance Works.

He rejoined the Legal Division in 1945 and in 1951 was appointed Assistant Secretary of Allied's Solvay Process Division.

In 1952 Mr. Gaston became Assistant Secretary and Director of Industrial Relations of Allied's Nitrogen Division.

Manpower shortages, a problem all of us face more and more often, can sometimes stifle a company's research program, impair production, as well as retard its development generally. Allied's Nitrogen Division has initiated a program to aid each of its managerial people develop each man in his charge to do as good or better than he can.

Key to program: Training conferences allow the entire managerial organization to . . .

JOHN M. GASTON Jr.
Director of Industrial Relations
Nitrogen Division, Allied Chemical & Dye Corporation

TRAIN FROM THE TOP DOWN

In this day of technical and managerial manpower shortages, sometimes those of us who are most concerned may tend to lay less emphasis on the greatest and most fertile source of talent. Of course, the students in school right now will be vital to us in the years to come. And it is hoped that some of our shortages can be relieved by persuading engineers now in other fields to join the chemical industry. But the future of the chemical industry really depends on the men who make it up today.

Nitrogen Division of Allied Chemical initiated a Management Development Program in 1952 and, of course, has continuously reviewed it since. In 1955 we felt that we should take a full-scale look at the program and review what substantial benefits we may have derived from it. And the review told us a great deal about what we had been doing.

One of the principal results, we found, was the benefit resulting from the practice of discussing problems in groups, the analysis of problems together and the clarification of ideas by being exposed to the thinking of others . . . of thinking things through together. Supervisors realized in these conferences that they shared common problems and that the methods for their solution were facilitated by the conference discussion approach. They began to get a real understanding of what it means to play on the team.

Our review indicated that generally the members of the program had advanced in knowledge of specific subjects and that their conferences had improved not only methods of thinking and a more realistic approach to problems but that they knew substantially more about various phases of their work.

The conference program dealt with three principal areas.

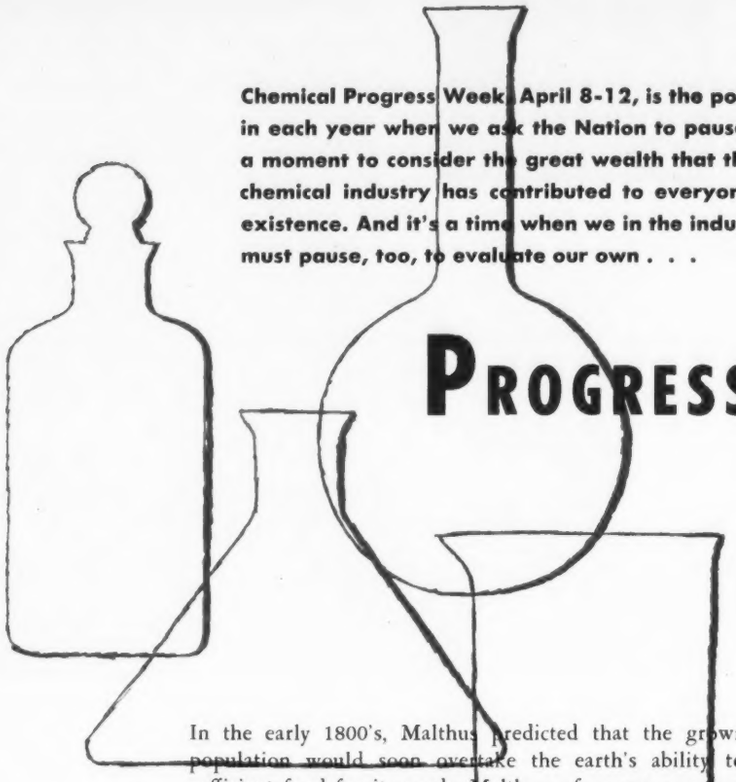
First, organization. The function of each department was considered and its relation to the other departments, both in the local plant and in Nitrogen Division as a whole. This improved understanding of the dependency of one department upon the other and the kind of relationships that would facilitate coordination of management effort.

Second, the conferences dealt with economic problems, the sale and distribution of our products and the economics of manpower and materials. The discussion on these subjects resulted in a better understanding of the sales situation and a better coordination between production and sales. It also helped greatly toward improved effort in cost efficiency.

Third, many subjects were discussed which fall

(*Please turn to page* 215)

Supervisors have found that they share common problems and feel that the methods for their solution can best be worked out by the conference discussion approach



Chemical Progress Week, April 8-12, is the point in each year when we ask the Nation to pause for a moment to consider the great wealth that the chemical industry has contributed to everyone's existence. And it's a time when we in the industry must pause, too, to evaluate our own . . .

PROGRESS... AND THE NEW FACE OF THE CH

JOHN L. GILLIS
Chairman of the Board
Manufacturing Chemists' Association

In the early 1800's, Malthus predicted that the growing world population would soon overtake the earth's ability to produce sufficient food for its needs. Malthus, of course, was something of an alarmist but the projected food needs for the United States indicate that we will soon get to the point where the present acreage under cultivation just won't be enough.

It's estimated that sometime around 1975 there'll be no such thing as a farm surplus problem . . . indeed, the Nation's farmlands will be pushed to the very limit to meet our food needs. And when this time comes, such things as chemical fertilizers, pesticides, and weed killers won't be just a means of increasing a farmer's income. They will be absolutely necessary to the upgrading of marginal land needed to produce sufficient food.

Or let's look at some other growth areas in the chemical field. Take titanium. Although a real rarity just a few years ago, titanium producers are planning . . . and gearing up for . . . tremendous markets in the very near future. Why such optimism? For example, the Government has just announced 1961 as the target date for a new heavy bomber with an all-titanium airframe.

Or look at chemicals in the construction field. Although it's now a multi-million dollar market, chemical materials now constitute only a small percentage of the total building materials sales. Yet prognosticators . . . and pretty astute observers . . . estimate that the time is near when plastics and light metals will account for a sizeable share of building materials sales.

Isolated examples? Not at all. Almost every phase of the chemical industry can boast developments which are doing a job better or more cheaply than it was ever done before . . . or doing a job which couldn't be done previously.

Early next month, we in the chemical industry will be observing Chemical Progress Week. And it seems to me that while we are pointing out our accomplishments and our plans, and the present magnitude of the industry, we inside the industry might do well to think of what this will mean to us in the future . . . and to consider the new face of the chemical industry over the next few years.

A few years back, Fortune magazine described this as "The Chemical Century" and suggested that the chemical industry might "take over all other industry" if the trends they saw then were to continue. And although it's doubtful that all other industry will be absorbed, their point is well taken: The old confines of the traditional chemical industry have widened to the point where today chemical processes are a vital part of virtually every industry.

This broadening of scope has taken many forms and has been the result of many factors. But of prime import is the nature of the chemical industry itself . . . probably characterized best by the word "aggressiveness." Aggressiveness in research as evidenced by the high research expenditures relative to sales. Aggressiveness in the development of production techniques, pointed up by the industry's ability to pare costs enough to maintain profit margins while holding down prices.

Aggressiveness in investing in the future . . . look at the industry's ability and willingness to expand capacity. And aggressiveness in sales and marketing has led to opening up whole new distribution systems to handle the vast succession of new products made possible through research.

The product of the chemical industry was valued at $11 billions in 1946 and last year reached a volume of $24.3 billions. And in 1965, the value is projected to be something like $44.6 billions. This expansion has taken and is taking place on a broad front. Most publicized have been acquisitions and mergers . . . often

CHEMICAL PROGRESS WEEK
APRIL 8-12

THE CHEMICAL INDUSTRY

involving companies not traditionally in the chemical business. Equally important, though less publicized, have been the expansions resulting from research and development programs within the companies in the industry.

This expansion has taken every form . . . horizontal integration within the chemical industry itself, diversification of non-chemical companies into the chemical industry, chemical companies going into wider areas. No single method of growth has predominated . . . growth itself seems to have been the rule. Growth by whatever means seemed best to fit the immediate objectives of the company or companies involved.

But two trends have made themselves apparent . . . backward integration toward raw materials such as petroleum and natural gas, and forward integration toward the consumer with packaged products for the household, garden and car.

And as the traditional chemical companies move into activities outside of the general manufacture of basic chemicals, other industries see and seize opportunities within the chemical field . . . the rubber industry, for example, first with synthetic rubber, then plastics, and now a wide range of intermediates. Petroleum companies have followed essentially the same pattern. They have converted benzene into phenol, xylene fractions into phthalic anhydride, natural gas into ammonia fertilizers for the farmer.

And other industries have followed suit. Paper companies are making such things as ethyl alcohol, vanillin, and dimethyl sulfide. Formaldehyde, polyvinyl alcohol, and phenolic plastics are supplied by a food company, silicone resins by a manufacturer of electrical equipment, agricultural chemicals by a firm whose chief interest was once coal.

(*Please turn to page* 219)

Mr. Gillis was graduated in 1933 from Washington University, St. Louis, Mo., with a BS degree in Business and Public Administration. He joined Monsanto at St. Louis as Assistant Export Manager. He held various positions in the company's export operations, and in 1946, was made Director of the Foreign Department.

He became a vice president in 1950, was placed in charge of all Monsanto marketing functions in 1953 and, in 1955, was elected to Monsanto's Board of Directors.

Mr. Gillis spent several months overseas in 1944 on a joint economic mission to North Africa, the Middle East and Italy for the Department of State, Department of Commerce, and the FEA. He is Chairman of the Board and a member of MCA's Executive Committee, and is active in civic and educational projects in St. Louis.

Thanks to research, rare earths are rapidly becoming "not so rare". Almost impossible-to-get rare earth materials are being made in commercial quantities in plant that produces . . .

pure rare earths by ion exchange

TED F. MEINHOLD, Associate Editor
with **DR. HOWARD E. KREMERS**
Technical Assistant to the President
Lindsay Chemical Company, West Chicago, Illinois

The rare earths — lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium — are not only difficult to pronounce, they are hard to separate too. Because they resemble each other so strongly chemically and physically, and are usually found only in minerals of complex composition, their existence as individual elements was not recognized for a long time.

Until recently, the best known methods for separating them was by: 1) selective precipitation, or 2) fractional crystallization. Both of these processes had disadvantages. In some cases they just weren't practical. The procedures involved were long, drawn out, and tedious — often requiring as many as 40,000 separate operations to yield an 80% pure product.

Thanks to the basic work done with ion exchange separation at the Ames Institute of Atomic Research, Iowa State College, Ames, Iowa, by Drs. F. H. Spedding, and J. E. Powell, commercial quantities of the previously difficult-to-separate rare earths are now becoming rapidly available. Lindsay Chemical Company, West Chicago, Illinois, largest producer of cerium, rare earth, and thorium chemicals, is using the ion-exchange process to separate samarium, europium, gadolinium, terbium, dysprosium, erbium, thulium, ytterbium, yttrium, lutetium, and holmium into purified rare earth compounds having purities up to 99.9%.

Although time and costs involved are still comparatively high, they are much lower than required by previous processes. Quantities made are small, but large enough to meet most of today's requirements. The important thing is that the process makes available, in commercial quantities, individual rare earths that were hitherto almost impossible to obtain. Separation takes place by cation exchange in several scores of 6″-diam x 6′-high Pyrex-brand glass columns, connected in series. Each column contains about one cubic foot of 30-40 mesh Dowex 50® (sulfonated styrene divinylbenzene copolymer) ion exchange resin.

Here is the description of the process: Monazite ore tailings, from other plant operations, are dissolved in nitric acid and treated with oxalic acid to remove impurities. The rare earths are precipitated as oxalates and ignited to form trivalent oxides. These are dissolved in hydrochloric acid to give a rare earth chloride solution containing about 50 grams of rare earths per liter prior to charging to ion exchange columns. Feed per column consists of about 2000 grams of rare earth oxide dissolved in 50 liters of solution.

Before introduction of the feed, resin beds are placed in a cupric state by passing a weak solution of copper sulfate through the columns. The rare earth-chloride solution is then fed into the system entering at the top of first column. Cupric ions on the resin are exchanged for ionized rare earth atoms, causing the rare earth to be adsorbed on the resin bed of the columns.

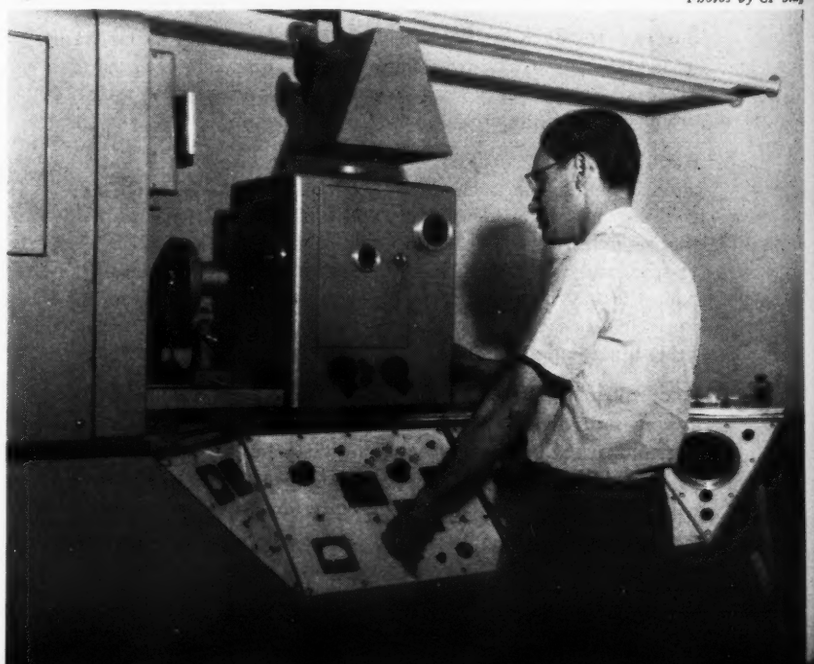
Separation of the rare earths takes place when a 0.4% solution of ammonium ethylenediamine tetraacetate (EDTA) is pumped through the system. The

(*Please turn to page* 18)

Purity of rare earths is determined by spectrograph in laboratory ▼

Separation of the rare earths takes place by ion exchange in 6″-diam x 6′-high Pyrex-brand glass columns ▶

Photos by CP Staff



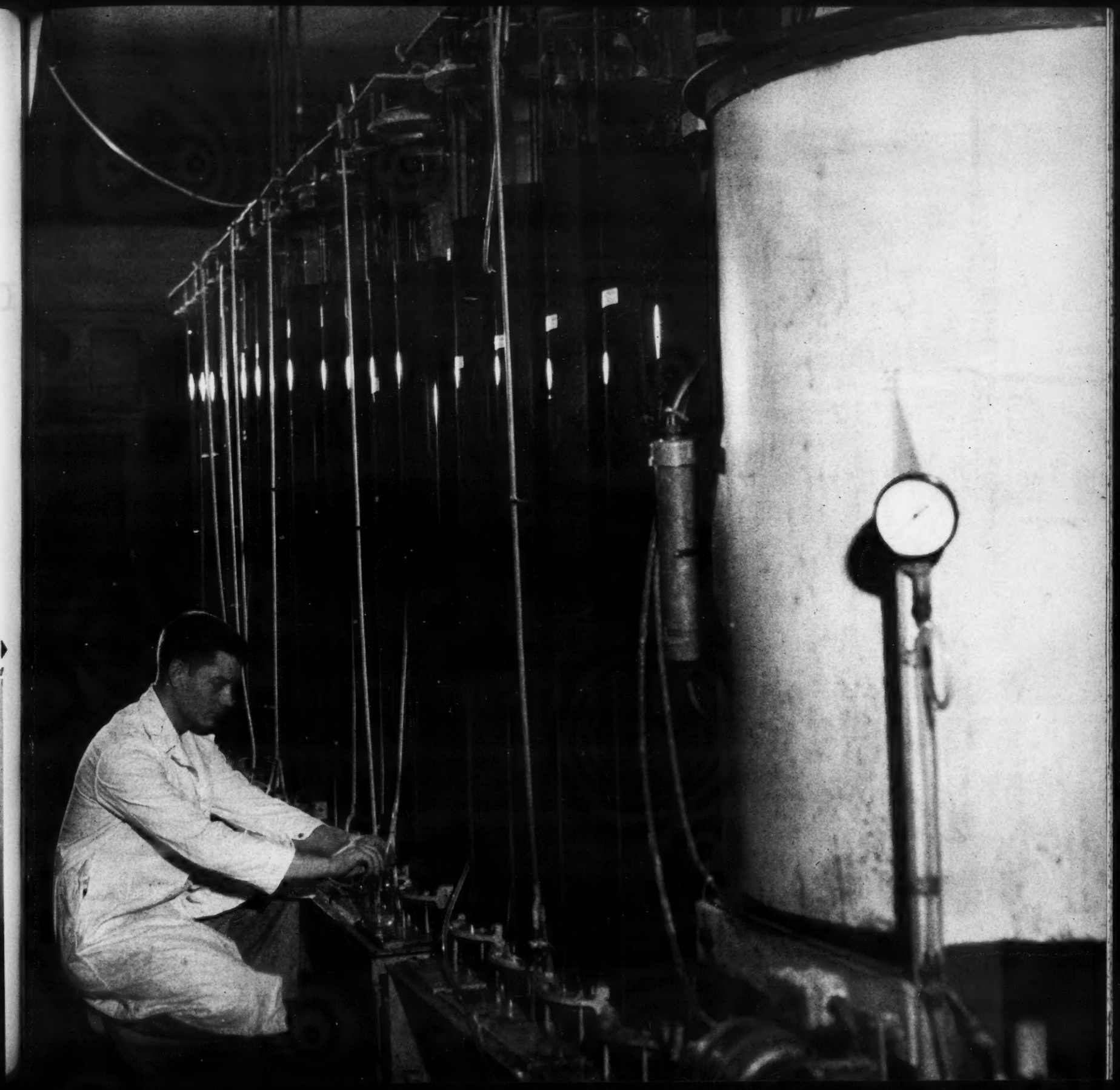


Photo Courtesy Phillips Petroleum Company

Painting distinctive forms in bright colors, deemphasizing "dismal equipment," gives a picture postcard look to the multiplex of columns, towers, and pipe of Phillips' Kansas City, Kansas, refinery

- **Processing plants become a visual asset to their communities**
- **Employe efficiency and morale go up**
- **Plant control is increased, operating expenses decrease**

These are big advantages of . . .

FOCAL-POINT PAINTING IN COLOR

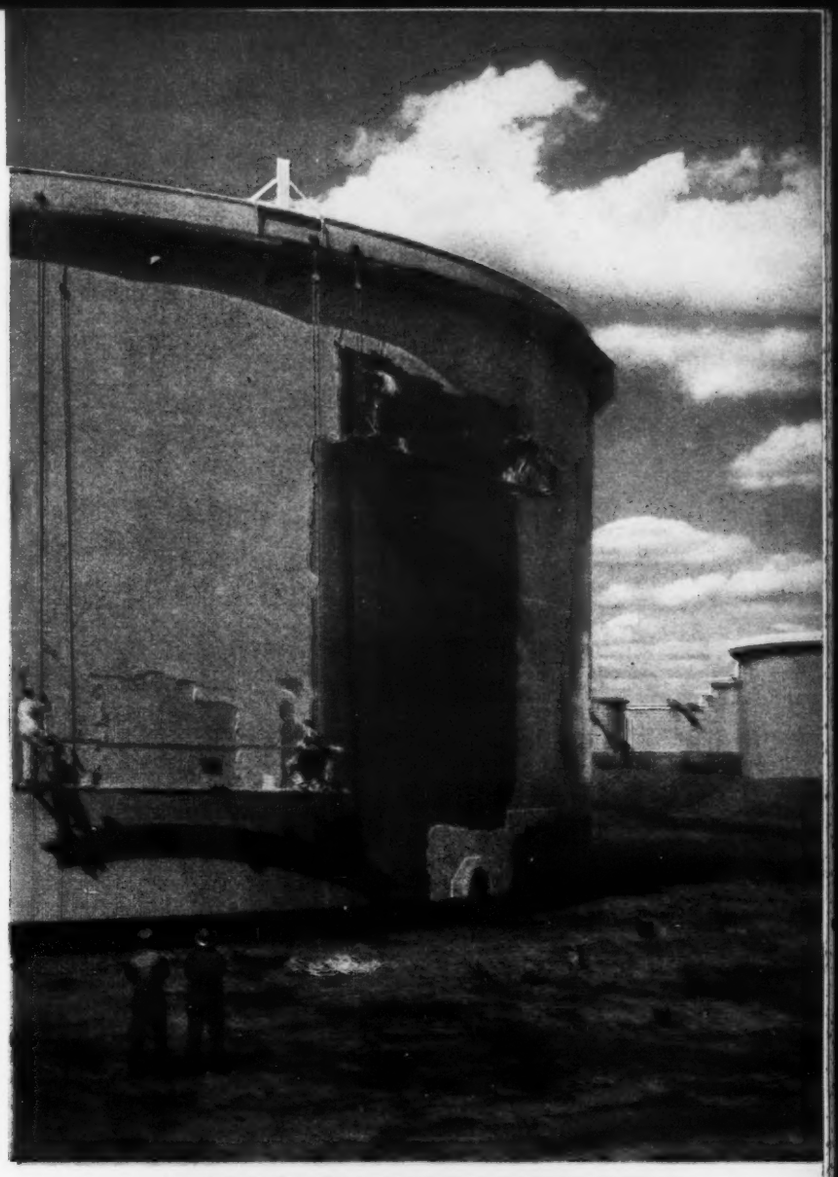
FOCAL-POINT painting — a procedure which utilizes a planned variation of colors to spotlight the best features of a plant and play down less-pleasing aspects — is paying dividends for an increasing number of industrial plants.

Some outstanding examples are the refineries of the Phillips Petroleum Company in Kansas City, Kansas; Okmulgee, Oklahoma; Phillips, Texas; and Woods Cross, Utah. A more recent example is Gulf Oil's Philadelphia refinery where a vast paint-up program involving 700 buildings, tanks, and refining units is underway.

Focal-point painting is akin to camouflage in that color is used to spotlight the plant's best features, distracting the eye from less pleasing points. Just as in camouflage, much planning is involved. A plant is surveyed with regard to its physical make-up, its location in relation to its surroundings, and its particular needs. Then the paint rollers, paint brushes, and spray guns are put to work to give the plant a brighter, cleaner appearance.

Phillips and Gulf Oil have found that a number of significant results have accrued:

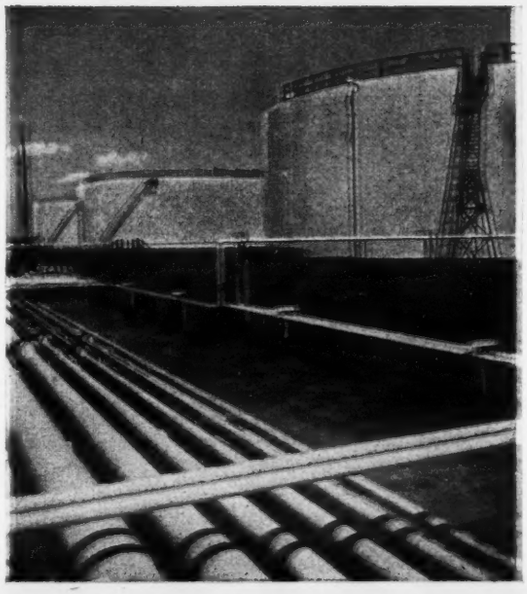
First, focal-point painting transformed their plants into a visual asset of the community. Besides that, the local citizenry identifies these at-



Scale model shows how portion of tank park looks to passengers flying in and out of Philadelphia's airport. Gulf emblems are right at home amid such a colorful bouquet. 40,000 vehicles on Penrose Ave. (right) also pass refinery each day

Pastel paints were roller-coated over existing aluminum finishes at Gulf's Philadelphia refinery. It took 21-thousand manhours to spread 15-thousand gallons of paint over the 2¼-million sq ft of tank surfaces in the 200-acre park. Colors are said to have better reflectance than metallic coatings

Gulf's "Operation Rainbow" will be complete in 2½ years when entire refinery is in color harmony. Costing little more than conventional paint job, focal-point painting has paid dividends



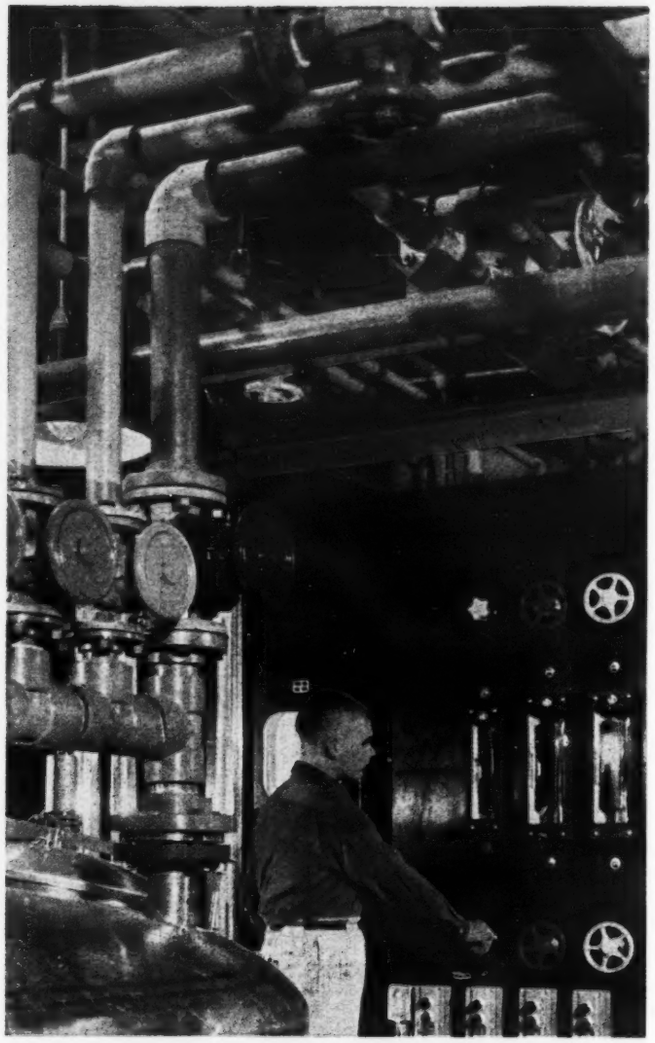
Above Photos Copyright 1956, E. I. du Pont de Nemours & Co. (Du Pont Magazine)

tractive refineries with efficiency and good management.

Second, painting has a very favorable influence on plant personnel. Working in pleasant surroundings, employes — from plant manager to broom superintendent — take greater pride in their jobs and in their company. Both efficiency and morale are improved . . . and plant areas are kept clean and fresh-looking. Since the additional costs for color are not much higher than a conventional maintenance painting, management feels that they are being repaid many times over.

Third, this multi-colored painting facilitates plant control and helps decrease operating expense. Here's how. The different colors are used to identify piping and tanks, to trace supply lines, to dis-

(*Please turn to page* 20)



Rigid PVC 2" pipe connected to inlet header of stainless steel reaction vessel in aluminum hydroxide plant

REHEIS FINDS R
BEST FOR C

PROBLEM: A number of metallic and non-metallic types of piping were tried for handling corrosives varying in pH from 1 to 13 at Reheis Company, manufacturer of fine chemicals. Some of the piping could not withstand the onslaught of the corrosives. Other materials met the corrosion resistance requirements but fell down on excessive cost.

Reheis is engaged in the conversion of commercial aluminum salts to high-purity aluminum hydroxide gels, chlorhydroxide, and other related chemicals for a quality-conscious pharmaceutical and cosmetic industry. In a recent plant expansion, the need arose for process piping, fittings, and valves that would have long life and not introduce corrosive contaminants into the product.

Solution: In June 1956 Reheis installed a rigid PVC piping system. Altogether, 6200 linear feet of 2 to 4" PVC pipe, 4930 PVC fittings, and 180 valves with PVC bodies were placed in service in the expanded aluminum hydroxide plant.

PVC piping system is made from Geon resin. Pipe is furnished in two grades — normal-impact and high-impact. Normal-impact type is unplasticized PVC with maximum corrosion resistance. For applications where unusual mechanical shocks may be encountered, a high-impact grade is available.

PVC pipe is available in long lengths, which minimize joints or unions required. At Reheis both Schedule 40 and 80 PVC pipe were used. Some

Reheis manufactures fine chemicals used in many leading pharmaceutical and cosmetic products

RIGID PVC PIPING FOR CORROSIVES

Low maintenance, versatility, non-contaminating property, and ability to withstand mechanical punishment among advantages

J. S. SCHAUL, JR., Chief Engineer
Alpha Plastics, Inc.
STEWART M. BEEKMAN
Director Engineering and Development
Reheis Company, Inc., Berkeley Heights, N. J.
With **CP Staff**

was installed by cementing and some by use of conventional threaded fittings.

For cementing, all that is needed is a square cut with a saw, a solvent cleaning of surfaces to be mated, and an application of PVC cement with a half-turn twist to insure uniform seals. In sections of plant where subsequent disassembly might be necessary, threaded pipe and fittings, or bolted flanges were used. In installing threaded pipe joints, the precaution of making them little more than hand-tight should be observed. High coefficient of expansion of the PVC pipe is a factor that should be considered in long runs of the piping affixed to steel supports.

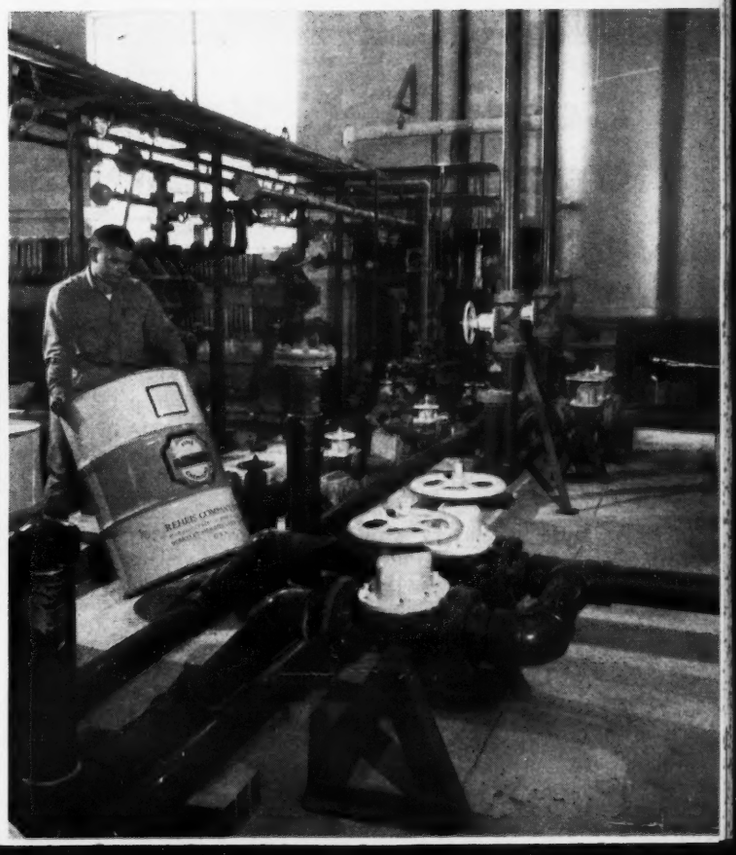
At Reheis the PVC piping is used at pressures up to 100 psig at temperatures from 60 to 120°F. Stainless piping is used right next to processing equipment where continuous temperatures above 150°F are encountered. Smooth internal walls of the PVC pipe provide a low pressure drop and insure against accumulation of scale and internal buildup.

Results: Much of PVC piping at Reheis has been in service more than six months and all indications point to a very satisfactory and durable system with little or no maintenance. Flexibility of system, which permits changes with minimum difficulties, has been used to advantage.

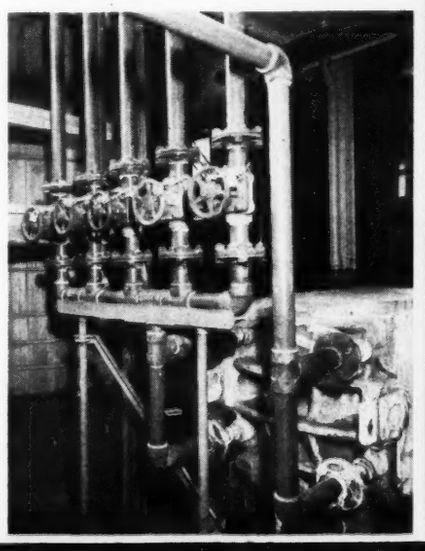
One good example has occurred, which illustrates

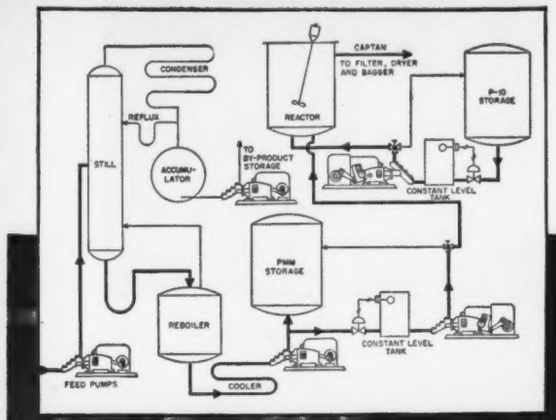
(*Please turn to page* 22)

These 4" PVC corrosive fluid transfer lines utilize cemented socket fittings. Use of flanges permits easy disassembly ▶

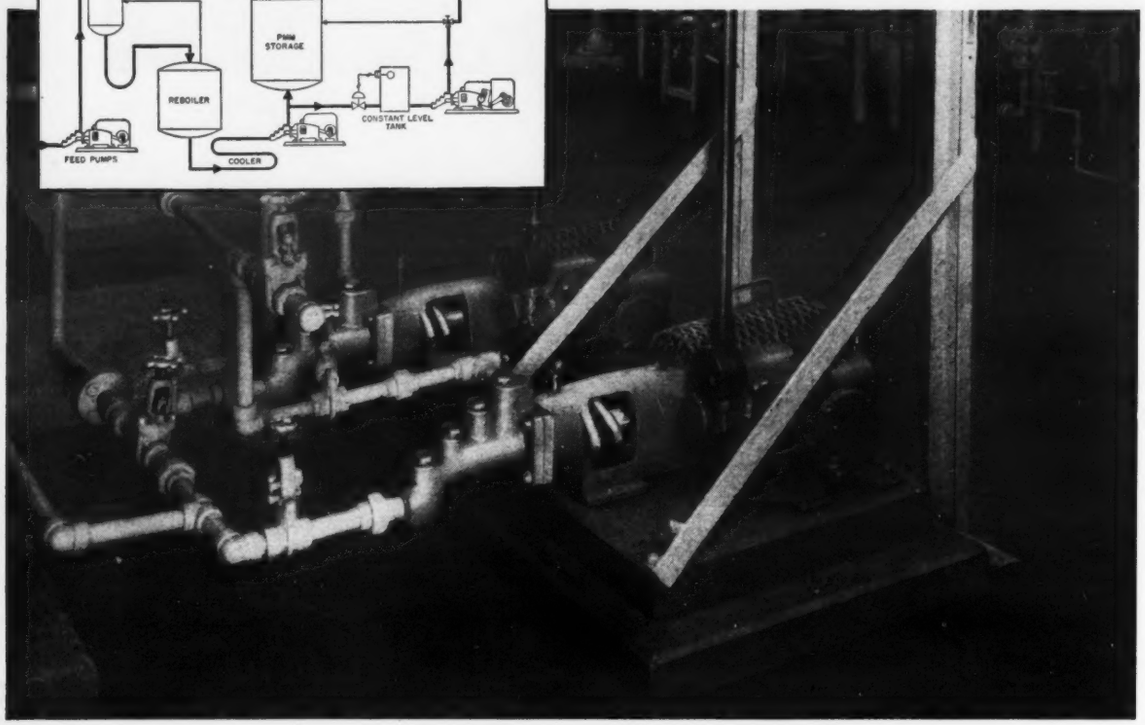


PVC piping system, connected to plate and frame filter press, handles alkaline liquors at pH of 10 to 13 ▼





In the production of Captan, an agricultural fungicide, Milton Roy pumps control feed rates in the separation of perchloromethylmercaptan by distillation at Calhio Chemicals, Inc., Perry, Ohio. The accurate delivery of these pumps also permits reacting of chemicals in stoichiometric amounts.



Controlled Volume Pumps hold critical material balances

Provide precise control of distillation columns

You can step up the efficiency of complex distillation processes with Milton Roy Controlled Volume Pumps. These pumps make possible extremely close control of chemical feed rates and rates at which distillates are withdrawn from the still. With precise control of feed and distillate rates comes the fine balance of chemical materials which is essential to ultimate product quality.

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Write today for application data on Controlled Volume Pumps in Process Instrumentation (Bulletin 1253).

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CONTROLLED VOLUME PUMPS

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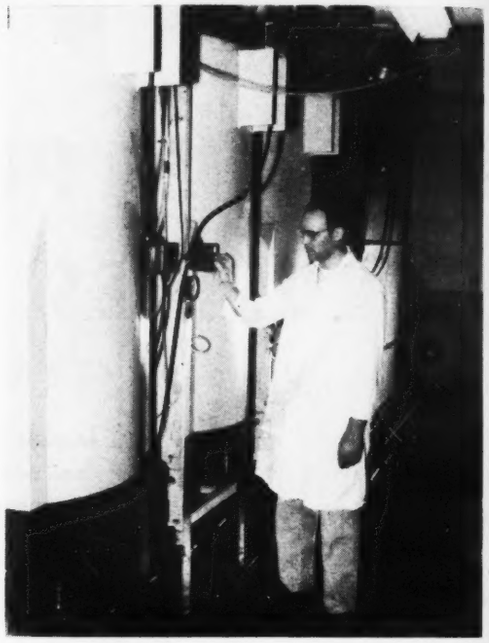
When inquiring check 2031 opposite last page

Rare Earths

(*Continued from page* 12)



Rare earth-chloride solutions are prepared in rubber-lined tanks to prevent any metallic pick-up

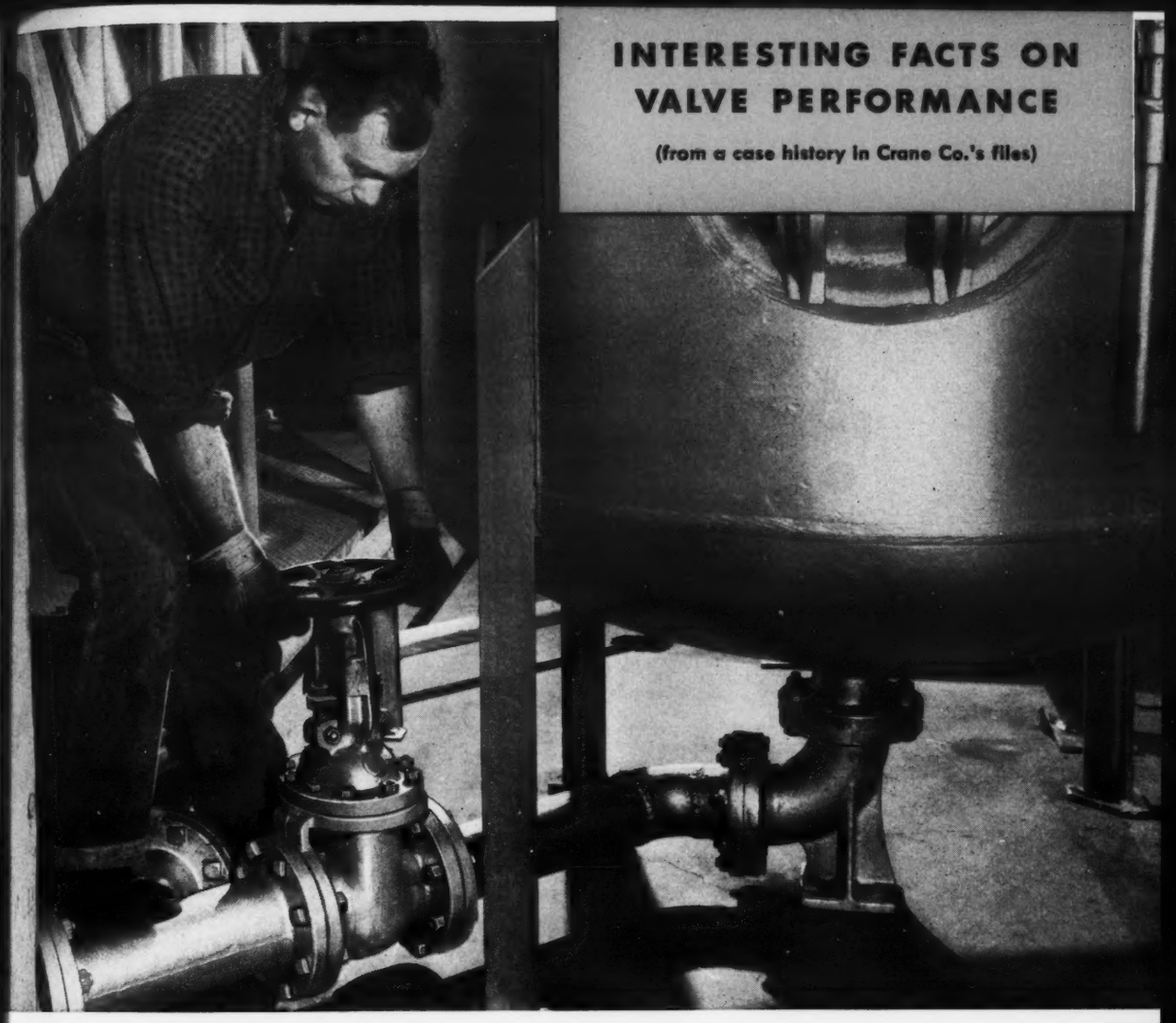
solution, at pH 8.0, is fed at rate of 200 ml per min at 18 psi. Separation occurs through elution. The least strongly held rare earth (lutetium) is released first, emerging in the form of a band several inches long. It is followed by the next strongly held rare earth (ytterbium) and continues until all the rare earths in the feed mixture have become separated into individual bands.

The EDTA solution and the rare earths form a soluble, stable complex which is less tightly held by the resin than the uncomplexed rare earth. As the complexing eluant passes through the columns, the bands are progressively displaced through the resin beds. The regions of overlap gradually become narrower until complete separation is accomplished. An average run may take up to 70 days to complete.

The minimum distance of elution required to obtain complete separation of a pair of rare earths can be calculated in advance of a given run. Critical factors for the overall process are speed of elution, concentration of eluant, and pH.

After the individual cuts have been made, the purified rare earth solutions are reacted with oxalic acid to form the rare earth oxalate. These are ignited in a muffle furnace at 800°C to form the corresponding rare earth oxide, a stable compound capable of being stored. Final purity is de-

(*Please turn to page* 19)



INTERESTING FACTS ON VALVE PERFORMANCE

(from a case history in Crane Co.'s files)

Four times longer valve life in corrosive creosote service

The scene is in the treating plant of the Long-Bell Division of the International Paper Company, at Longview, Washington. The valve in the line from hot well to creosoting retorts is a Crane Ni-Resist gate, installed in 1949.

However, back in 1947, another make valve of the same type was used here. But it was an early victim of corrosion from the creosote and light oil vapors present. It began to leak in less than a year, and had to be replaced with this Crane valve after 18 months.

In contrast, the Crane Ni-Resist valve resisted leakage for 6 years, until its disc was corroded in 1955. Even then, only the disc was replaced, and the original valve is still in service.

Combined with Crane design and workmanship, Ni-Resist alloy cast iron with 18-8 S Mo trim provides the most economical valves for many process industries. They have substantially greater resistance to corrosion, erosion and wear than ordinary cast iron valves, yet cost very little more.

Look into these valves with your Crane Representative, or write to Crane for Circular AD-2047. Turn page for more details.

CRANE **VALVES & FITTINGS**

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

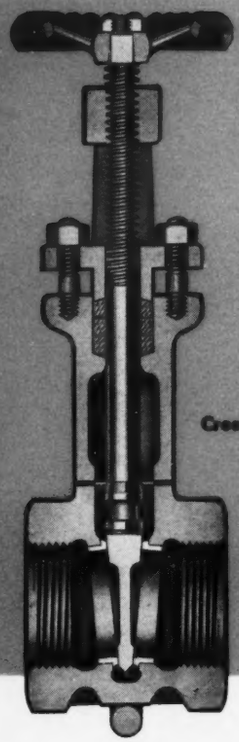
More Facts on Ni-Resist Valves— See Over

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Most economical on many corrosive fluids

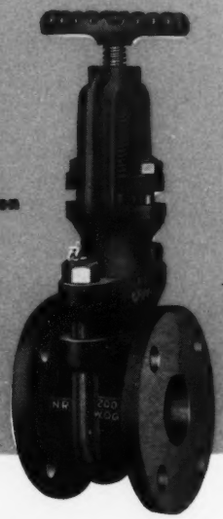
CRANE Ni-Resist Alloy Cast Iron Gate Valves

18-8 SMo Stainless Steel Trimmed



All valves have solid wedge disc, outside screw and yoke.

Clamp-type bonnet joint pattern. Screwed ends, ½- to 2-in. sizes. Flanged ends, 1- to 3-in. sizes.



Cross section

These valves have a reputation for cutting piping costs in process industries. They do it by providing greater resistance to corrosion, erosion and wear at a nominal increase in price over ordinary cast iron valves.

In soda and sulfate pulp mill services . . . in creosote wood treating . . . and in petroleum refineries, for handling sour distillates and crudes, Crane Ni-Resist valves have a record of exceptional suitability.

They consistently outperform ordinary cast iron valves on fluids such as highly volatile liquids . . . corrosive vapors and gases . . . certain acid, salt, chloride, sulfate and alkaline solutions . . . sea water and brine.

Big Selection—Sizes ½ to 8 in.

You'll have no trouble in choosing Crane Ni-Resist valves for your needs. In small sizes, Crane builds them in screwed and flanged patterns. Both feature compact end-to-end dimension and a strong, tight, yet easy-to-open clamp-type bonnet joint. Larger sizes have bolted bonnets and flanged ends.

Ask for Circular AD-2047

This circular gives you complete descriptive and ordering data. Ask your Crane Representative for a copy next time he calls, or we'll gladly send it by mail.

WORKING PRESSURES:

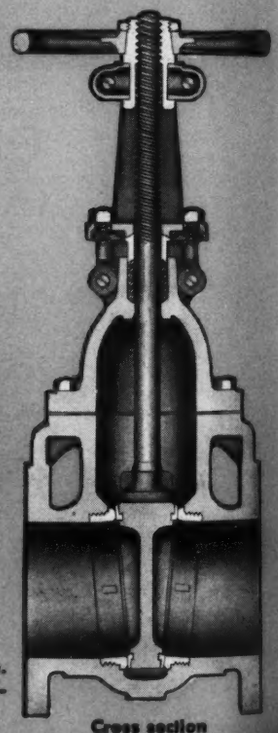
SCREWED END VALVES—225 pounds, water, oil or gas, non-shock.

FLANGED END VALVES—200 pounds, water, oil or gas, non-shock.

All valves air tested

WHAT NI-RESIST IS

Ni-Resist is a superior alloy cast iron containing an appreciable amount of nickel. Although its physical properties are about equal to those of cast iron, Ni-Resist offers substantially greater resistance to corrosion, erosion and wear.



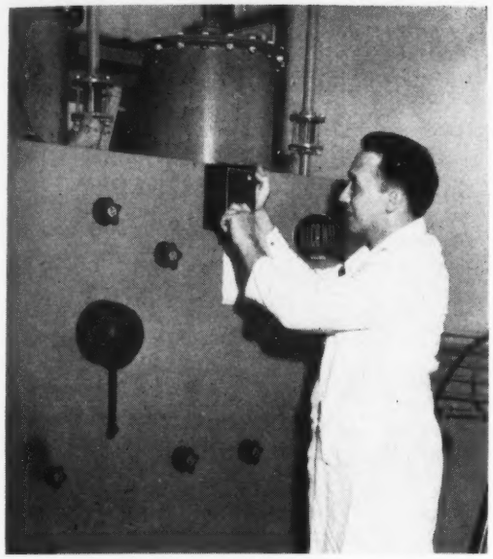
All valves feature sturdy construction, dependable operation, easy maintenance.

Bolted bonnet joint pattern. Flanged ends only, 4-, 6- and 8-in. sizes.

Cross section

Rare Earths

(*Continued from page* 18)



Water conditioner supplies deionized water (less than 3ppm solids content) for preparing complexing solution

termined by means of a spectrograph.

(Pure rare earths are available from Lindsay Chemical Company, Dept. CP, 268 Ann Street, West Chicago, Illinois . . . or for more information check 2032 on form opposite last page.)

(Dowex 50® ion exchange resins used in process were obtained from Illinois Water Treatment Company, Rockford, Illinois. The resins are produced by The Dow Chemical Company, Midland, Michigan . . . or for more information check 2033 on form opposite last page.)

Is it strange

. . . that you should receive a magazine such as CHEMICAL PROCESSING without being subjected to the "formality" of a token subscription payment?

Not at all! For reasons why . . .

. . . see page 79.

For more information on product at left, specify 2034 . . . see information request blank opposite last page.

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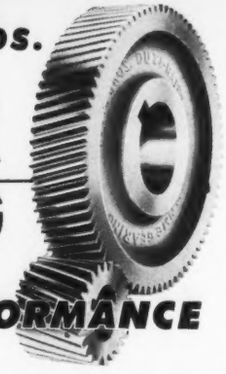
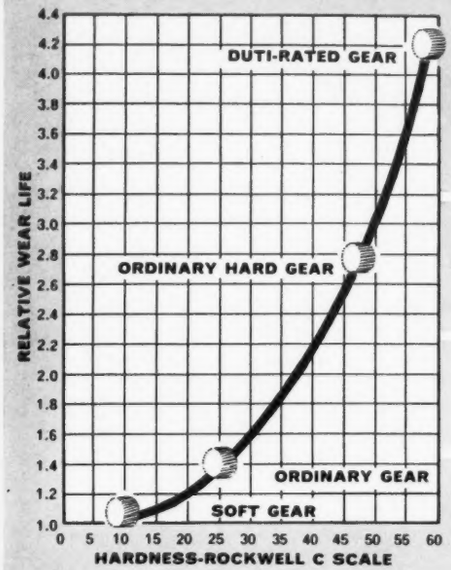
Duti-Rated
LIFETIME GEARING



GIVES BETTER PERFORMANCE
...LONGER LIFE

GEAR PERFORMANCE COMPARISON CHART



DUTI-RATED GEAR—
Hardened after cutting. Precision processing permits maximum hardness while holding accuracy within extremely close tolerances.

ORDINARY HARD GEAR—
Hardened after hobbing and shaving; hardness limited to maintain reasonable accuracy.

ORDINARY GEAR—
Hardened before cutting; hardening limited to maintain machinability.

SOFT GEAR—
Low hardness—excessive size required because of low capacity.

Write for DUTI-RATED Gear and LINE-O-POWER Catalogs.
See how you can get more for your drive dollar.

this trademark stands for the finest industrial gearing made

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Better Power Transmission Through Better Gears
FOOTE BROS. GEAR AND MACHINE CORPORATION
4555 South Western Boulevard Chicago 9, Illinois

When inquiring check 2036 opposite last page

Focal-point Painting

(*Continued from page 15*)

tinguish materials and manufacturing processes. Light-colored and white finishes reduce heat and evaporation losses in storage tanks — they are said to be actually better than metallic finishes. Safety-color codes are used to cut down accidents and the resulting lost manhours.

Every paint and color is chosen for both durability and eye-appeal. Even though there are many colors, they are all chosen to harmonize. Good planning is necessary to keep it from becoming a cacophony of color.

"Operation Rainbow" at Gulf Oil

So far, "Operation Rainbow" at Gulf's Philadelphia refinery has spread 15,000 gallons of pastel-colored paint over 2¼ million square feet of tank surfaces, and has been given an award of merit by the city.

First to get "color treatment" were the refinery's two big tank farms. After the 55 tanks blossomed into a harmony of pastels, refinery personnel started calling the areas "our tank parks."

Passengers on the 300 flights that pass daily in and out of nearby International Airport have an excellent view of the refinery and the tank park. The Gulf emblems emblazoned on these tanks are right at home among such a colorful bouquet.

Four basic pastels were developed for the Gulf tanks: Caribbean Blue, Tropic Yellow, Cay Coral Pink, and Bahama Green. These paints were patterned after Dulux tank enamel white, an alkyd resin-base enamel, very popular as an exterior finish for metal storage tanks to reduce internal temperatures, and thus, evaporation losses. The pastel finishes were formulated for maximum gloss and color retention, consistent with cleanliness requirements. Requirements called for a finish that could be applied in one application by a cross roller-coat at a film thickness of approximately two mils. Finishes were spread on existing aluminum coatings which had been touched up with a durable structural steel primer.

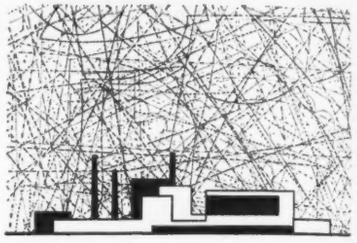
Except for the blue, the new pastels are reported to have better reflectance than metallic coatings. Furthermore it is expected that the pastel's reflectance will improve on aging.

The entire 700-acre, 183-thousand-bpd refinery is scheduled for focal-point painting. Because of its enormity, this will take 2½ years. This sounds like a costly project, but actually the costs are little more than a routine conventional-color maintenance job.

Gulf has found that light colors have improved plant safety and increased plant housekeeping efficiency. Leaks and spillage are noticed immediately by everyone, so great personal pride is taken in preventing them and in keeping areas

SITUATION WANTED

PLANT NEEDING
HEAVY DUTY
CORROSION PROTECTION



If paint is doing a satisfactory job of protecting your plant structure or equipment against chemical fumes, splash or spray, stop right here. If not, GACO Neoprene N-700 Maintenance Coating is a product you should know about. It wraps a film of tough, elastic Neoprene rubber around metal, wood, or concrete; offers the advantages of higher resistance to corrosive agents, wide temperature ranges, sunlight, weathering, surface abrasion—and at lower applied cost.

GACO Neoprene STARTS work where the toughest paints fail

You get a back-log of almost 20 years of experience in corrosion control among the top names in U.S. Industry when you specify GACO Neoprene Protective Coatings. And there's an entire family of GACO products and services available including field technicians, laboratory, fabrication, and lining facilities. A GACO Corrosion Specialist in your area is prepared to serve you. For complete information, write—we'll forward literature of interest.

GATES ENGINEERING COMPANY
Wilmington 99, Delaware

Pioneer Leader In Protective Coatings

Authorized Distributors in principal cities U.S.A. Australia. Belgium. England. Finland. France. Israel. Japan. Norway. Okinawa. Philippine Islands. Puerto Rico. Sweden. In Canada: Gaco Products Ltd., Brantford, Ontario.

When inquiring check 2037
opposite last page

spic-and-span. Since the painting program commenced, requisitions for clean-up rags from refinery storerooms have increased four-fold.

"Operation Rainbow" has not gone unrecognized. A distinctive plaque in General Manager J. O. Timms' office is inscribed:

> **CITATION OF MERIT**
> *is awarded to*
> **Gulf Oil Corporation**
> **For its Civic Pride**
> **and Cooperation with the**
> **CLEAN UP • PAINT UP**
> **FIX UP CAMPAIGN**
> **of the Chamber of Commerce**
> **of Philadelphia**
> MAYOR RICHARDSON DILWORTH
> *Honorary Chairman*
> C. P. JARDEN
> MRS. WALTER A. CRAIG *Co-Chairmen*

Phillips' Fillip

One of the first oil companies to apply this idea of focal-point painting was Phillips Petroleum Company. Back at the turn of this decade, Phillips worked with the DuPont Company in developing the colorful paints. The first refinery to be "face-lifted" was Phillips' Kansas City, Kansas, unit. Since it is easily seen from heavily trafficked Fairfax Avenue and the intercity trafficway bridge over the Kaw, as well as from the air, the refinery was a good place to experiment.

Since then, Phillips has painted other refineries in these bright, gay colors. Phillips management has found these investments well justified. In addition to developing a feeling of *esprit de corps* among refinery teams, they have found that passers-by get the favorable impression that the refineries are clean — even attractive. Since prominent orange and black shields are in evidence, immediate product identification is established.

(Focal-point painting is a development of E. I. du Pont de Nemours & Co., (Inc.), Dept. CP, Wilmington 98, Del. . . . or for more information check 2038 on form opposite last page.)

(Gulf refinery painting program was developed in collaboration with Oliver B. Cannon & Son, Inc., Dept. CP, 5604 Woodland Ave., Philadelphia, Pa.)

ENGINEERING DEPT.—SUMMARY REPORT

To: T.M.D. Vice Pres., Production

From: R.R.G. Chief Engr., Inorganics

SUBJECT: Test Program—Sharples Super-D-Hydrator, caustic soda production.

MATERAL: Slurry from double effect evaporator taken from second effect underflow at 25% sodium hydroxide concentration.

OBJECTIVE:
a. Recovery of sodium chloride crystals with minimum entrained caustic.

b. Reduction of sodium sulphate content of sodium chloride crystals by use of brine rinse.

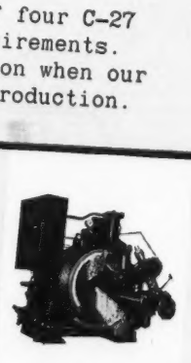
RESULTS: Production runs were made on a C-27 Super-D-Hydrator under controlled conditions of application of cell liquor, water, and saturated brine rinses.

At a capacity of 4.50 tons of salt per hour, using 0.1 lbs. of rinse water per lb., and 0.7 lbs. of brine per lb. of salt, the salt crystals were discharged at 0.1% NaOH content with less than 0.6% sodium sulphate.

ACTION: The sulphate-laden brine rinse was automatically kept separate from the mother liquor and the valuable alkali-bearing rinse liquor.

Immediate recommendation of the purchase of four C-27 Super-D-Hydrators to meet our existing requirements. This same equipment will handle 20% expansion when our new source of low sulphate salt goes into production.

The Sharples Super-D-Hydrator produces high purity crystals of very low moisture content at capacities up to 8 tons per hour. Its flexibility and unparalleled performance are recognized throughout industry. We shall be glad to send you a copy of Sharples Bulletin 1257.



SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS • SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON
Associated Companies and Representatives throughout the World

When inquiring check 2039 opposite last page

Rigid PVC Piping

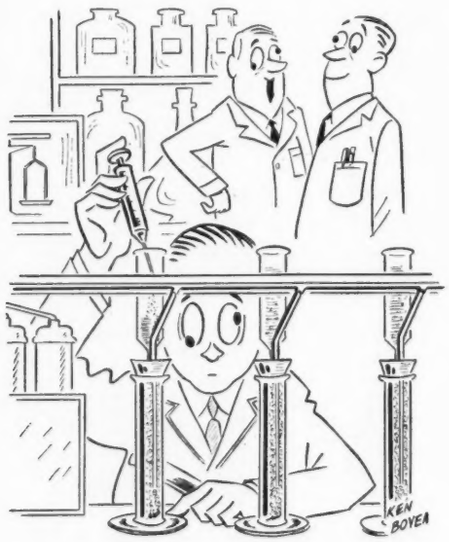
(*Continued from page* 17)

the capacity of the PVC pipe to perform in a semi-elastic manner under stress. A socket-cemented 3" line of normal-impact PVC pipe has successfully withstood punishing water hammer from diaphragm slurry pressure pumps for more than six months.

Ease of installation, low initial cost, and performance have shown the PVC piping system to be the most economical among those considered. Non-contaminating property of the plastic piping has helped to maintain the high quality of the fine chemicals made at Reheis.

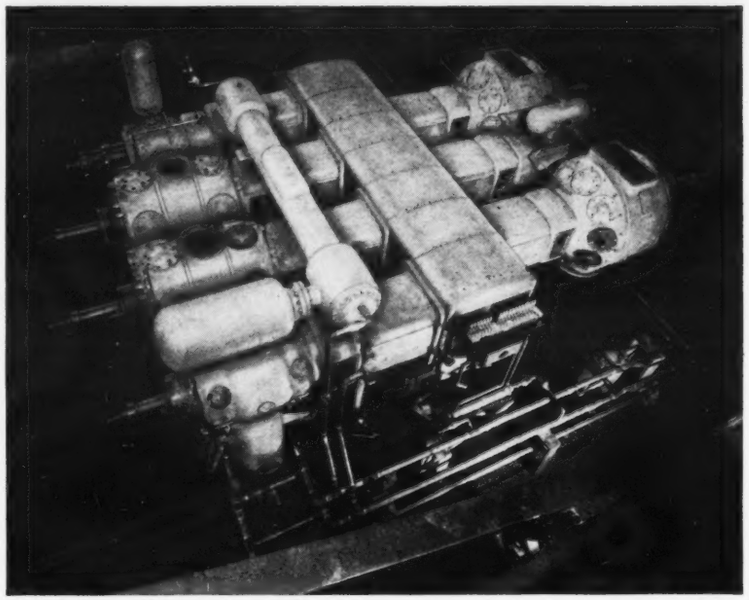
(For further information on PVC pipe, fittings, and valves contact Alpha Plastics, Inc., Dept. CP, Okner Parkway, Livingston, N.J. . . . or check 2040 on convenient Reader Service slip which is located opposite last page.)

(Geon PVC resin is product of B. F. Goodrich Chemical Co., Dept. CP, 3135 Euclid Ave., Cleveland 15, Ohio . . . or for more information check 2041 on convenient Reader Service slip which is located opposite last page.)

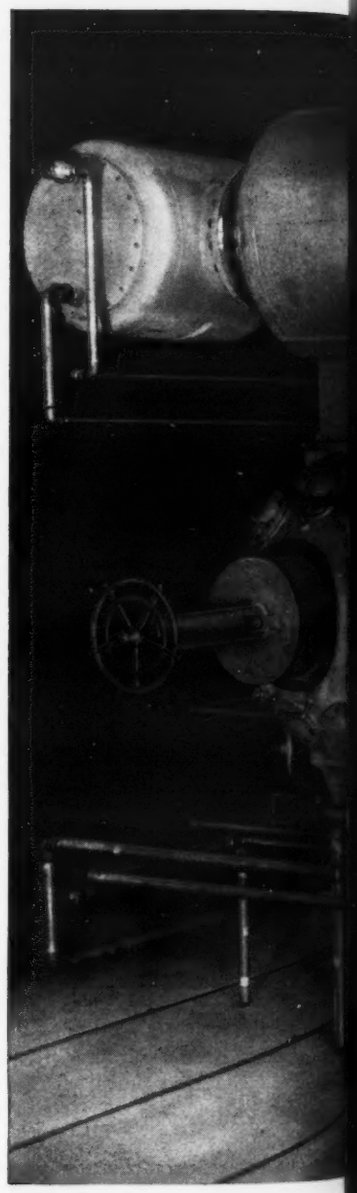


"I've been keeping an eye on Morley. He has improved his technique greatly."

Here's one from Ken Boyea, Hercules Powder Co., Holyoke, Mass.



CP BUILDS 'EM BIG

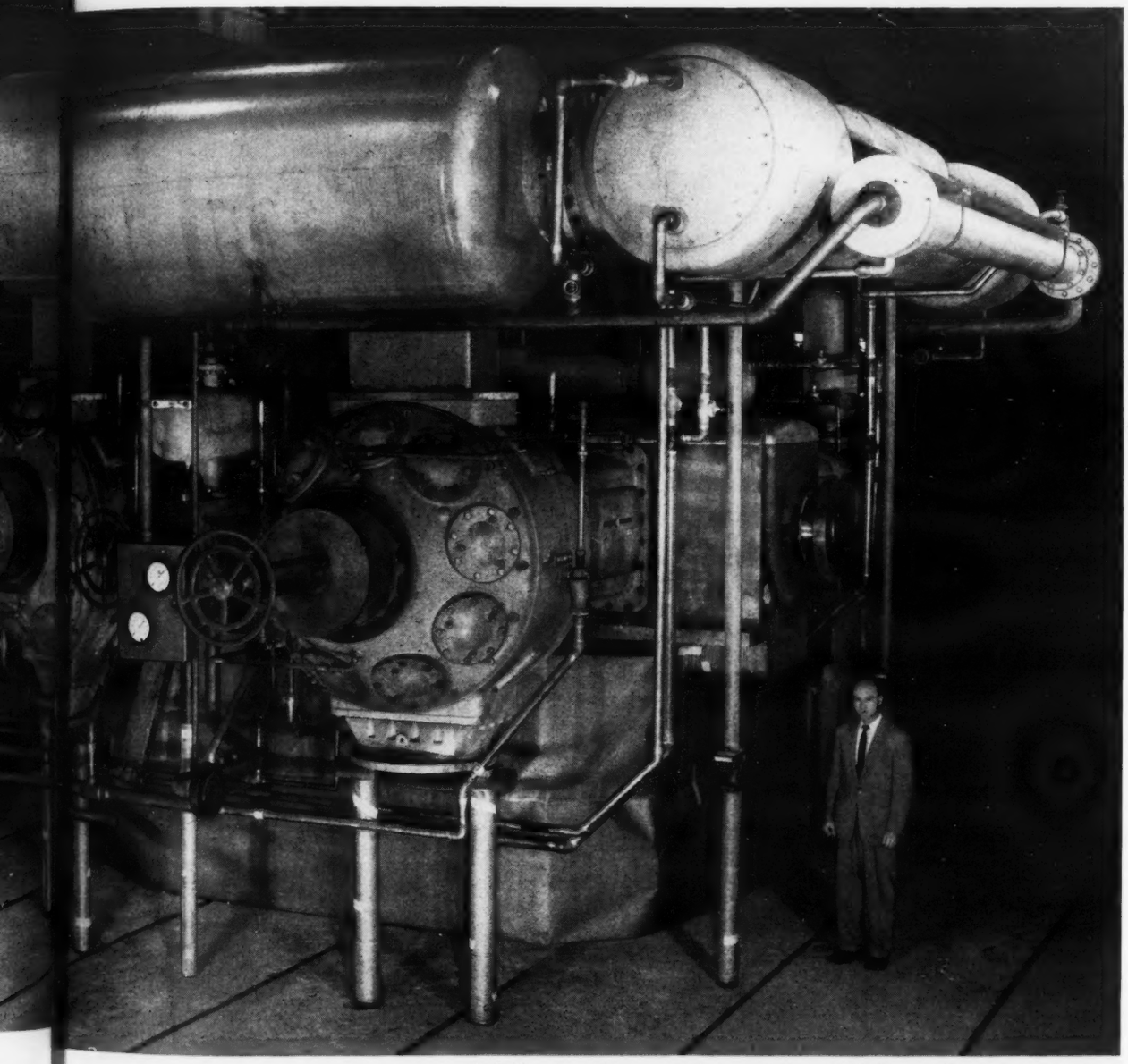


This compressor *is* big! It's one of a pair of 3500 horsepower, five-stage machines built for process work.

Class FE balanced-opposed compressors are outstanding in every way – high efficiency, proved dependability, moderate ratings, accessibility. They are uniquely adaptable for widely varying conditions, in sizes up to 5000 H.P., for high vacuum or pressures up to 15,000 psig. For synthetic ammonia production, air separation, or other continuous processes, Class FE Compressors offer the utmost in efficiency and availability.

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS



Variable volume clearance pockets on all stages of this Class FE Compressor control output. All components, intercoolers and piping were factory-assembled before shipment.

When inquiring check 2042 opposite last page

Anode life extended on 100,000 gal tank by factor of 5 . . .

former units were replaced twice a year; five-year service life now expected

Problem: Metal anodes protecting a 100,000 gal fresh water storage tank in a large eastern plant were so rapidly destroyed that replacement was required twice yearly. Water is softened, and kept at a temperature of approximately 100°F. Because calcareous deposits, which tend to retard corrosion, cannot form on tank surface in soft water environment, a relatively high current density had to be maintained. Water has pH of 8.8 and resistivity of 3000 ohm-centimeters.

Solution: In August 1954, 20 anodes of a high-silicon cast iron, known as Duriron Type-A, were installed to protect storage tank.

Two anodes (1″ diameter x 60″) were joined end-to-end to make a single 10′ length. Ten of these lengths were installed vertically 10′ below top of tank. They are evenly spaced in a 14′ circular pattern around the center. Driving voltage is 21. Total current output is 29 amp or approximately 1.16 amp/sq ft. Rectifier capacity is 36 volts and 30 amp.

Results: Anodes have been in service for more than two years — more than 500,000 amp-hr. Rectifier voltage and current output have remained stable. Tank and anodes are inspected regularly. No corrosion of the tank has occurred, and anodes show uniform consumption of a small magnitude even at relatively high current density used. A service life of at least five years is expected.

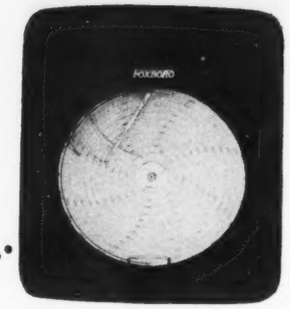
(Duriron Type-A anodes were supplied by The Duriron Co., Inc., Dept. CP, Dayton 1, Ohio . . . or for more information check 2043 on the convenient Reader Service slip which is located opposite last page.)

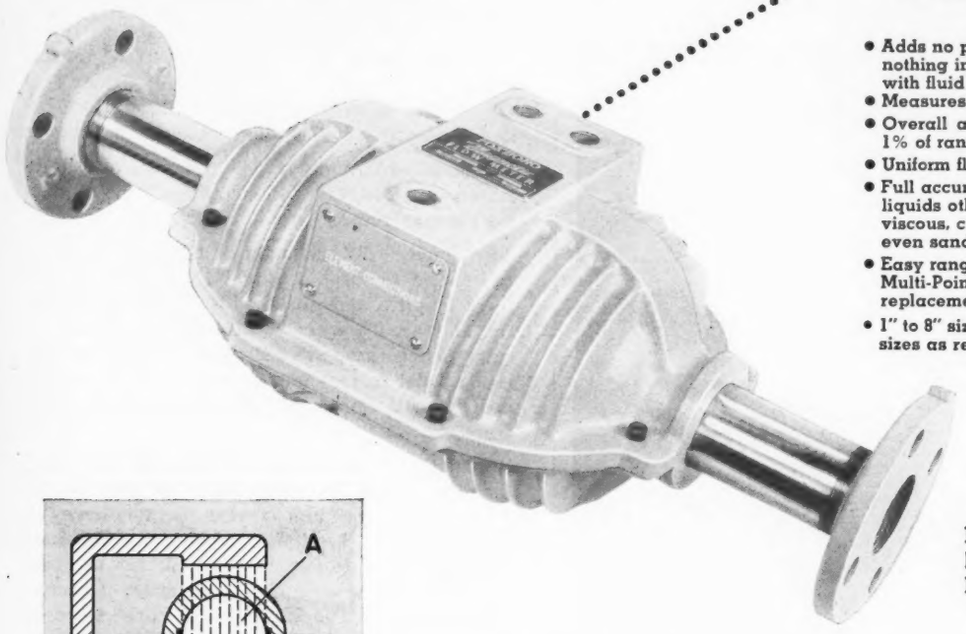
Tells role of reducing valves in plastics molding

Installation and operation of manufacturer's pressure reducing valves in plastics molding plant is described and illustrated in four-page bulletin. Valves operate where initial pressures of 5000 psi have to be accurately controlled at various lower pressures for molding Bakelite and other plastic material.

"Proper Regulators Simplify Plastics Molding Operations" is issued by Atlas Valve Company, Dept. CP, 280 South St., Newark 5, New Jersey. When inquiring specify 2044 on the convenient Reader Service slip which is located opposite last page.

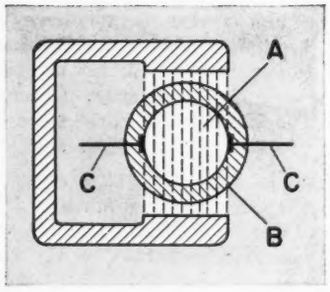
NOW! a flow meter with no flow restrictions!





- Adds no pressure drop — nothing inside pipe to interfere with fluid flow.
- Measures fluid velocity directly.
- Overall accuracy better than 1% of range over entire scale.
- Uniform flow scale.
- Full accuracy sustained even on liquids other meters can't handle: viscous, corrosive, or pulpy — even sand-water slurries.
- Easy range change — either by Multi-Point Switch or range coil replacement, as preferred.
- 1" to 8" sizes standard — larger sizes as required.

FOXBORO MAGNETIC FLOW METER



SIMPLE, TROUBLEFREE, OPERATION

The Foxboro Magnetic Flow Meter operates on the same principle as a power generator. A magnetic field (A) is maintained through a standard pipe section (B) of stainless steel or other non-magnetic material. This pipe section is lined with Kel-F® or other insulating material. Liquid passing through pipe acts as moving conductor, generating an electric voltage which varies in proportion to liquid's average velocity. Flush electrodes (C) in pipe wall "pick up" this voltage which is recorded in desired flow units by Dynalog Electronic Recorder or Controller.

This premium-performance meter measures *magnetically* the flow rate of virtually any liquid except hydrocarbons. It completely ignores such common metering headaches as turbulence, suspended solids, and variations in conductivity, density, and viscosity. It even measures reversing flows.

Installation is simple. The magnetic spool piece connects into the line like any equivalent length of pipe — no seals, purges, meter runs, or straightening vanes required. Connects by 2-conductor cable to remote Dynalog Electronic Flow Recorder.

Maintenance is practically eliminated. There are no pressure taps to become plugged or frozen, no working parts to foul.

Foxboro Magnetic Flow Meters are already in use on such widely different liquids as beer, sand-and-water, rosin size, rock-and-acid slurry, viscose, and highly corrosive liquid detergent. Find out how this precise, troublefree flow meter can help *your* processing. Write for complete details.

THE FOXBORO COMPANY, 813 NEPONSET AVENUE, FOXBORO, MASS., U. S. A.

FOXBORO
REG. U. S. PAT. OFF.

Foremost in FLOW METERING

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

When inquiring check 2045 opposite last page

March 3-6. American Institute of Chemical Engineers, meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

March 4-8. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh.

March 11-15. Atomic Exposition and Nuclear Congress, Convention Hall, Philadelphia.

March 11-15. National Association of Corrosion Engineers, Thirteenth Annual Conference and Exhibition, Kiel Auditorium, St. Louis.

March 12. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

March 12-13. Chemical Market Research Association, conference, Sheraton Hotel, Philadelphia.

March 14-15. National Industrial Conference Board, fifth conference on atomic energy, Benjamin Franklin Hotel, Convention Hall, Philadelphia.

March 18-21. Society of the Plastics Industry Annual National Conference and Pacific Coast Plastics Exposition, Hotel Biltmore and Shrine Exposition Hall, Los Angeles.

March 25-29. Tenth Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles.

March 27-28. Commercial Chemical Development Association, plastics meeting, Hotel Statler, New York.

March 27-29. Nineteenth Annual American Power Conference, Hotel Sherman, Chicago.

April 7-12. American Chemical Society, national meeting, Miami, Florida.

April 8-12. American Welding Society, Annual National Spring Meeting, Hotel Sheraton, Philadelphia.

April 9-11. Fifth Welding Show, Convention Hall, Philadelphia.

April 16-18. Symposium on Non-Destructive Tests of Nuclear Energy, sponsored jointly by American Society for Testing Materials, American Institute of Chemical Engineers, American Nuclear Society, and Society for Non-Destructive Testing, Morrison Hotel, Chicago.

April 24-25. National Industrial Research Conference, Conrad Hilton Hotel, Chicago.

April 29-*May* 3. Seventh National Materials Handling Exposition, Convention Hall, Philadelphia.

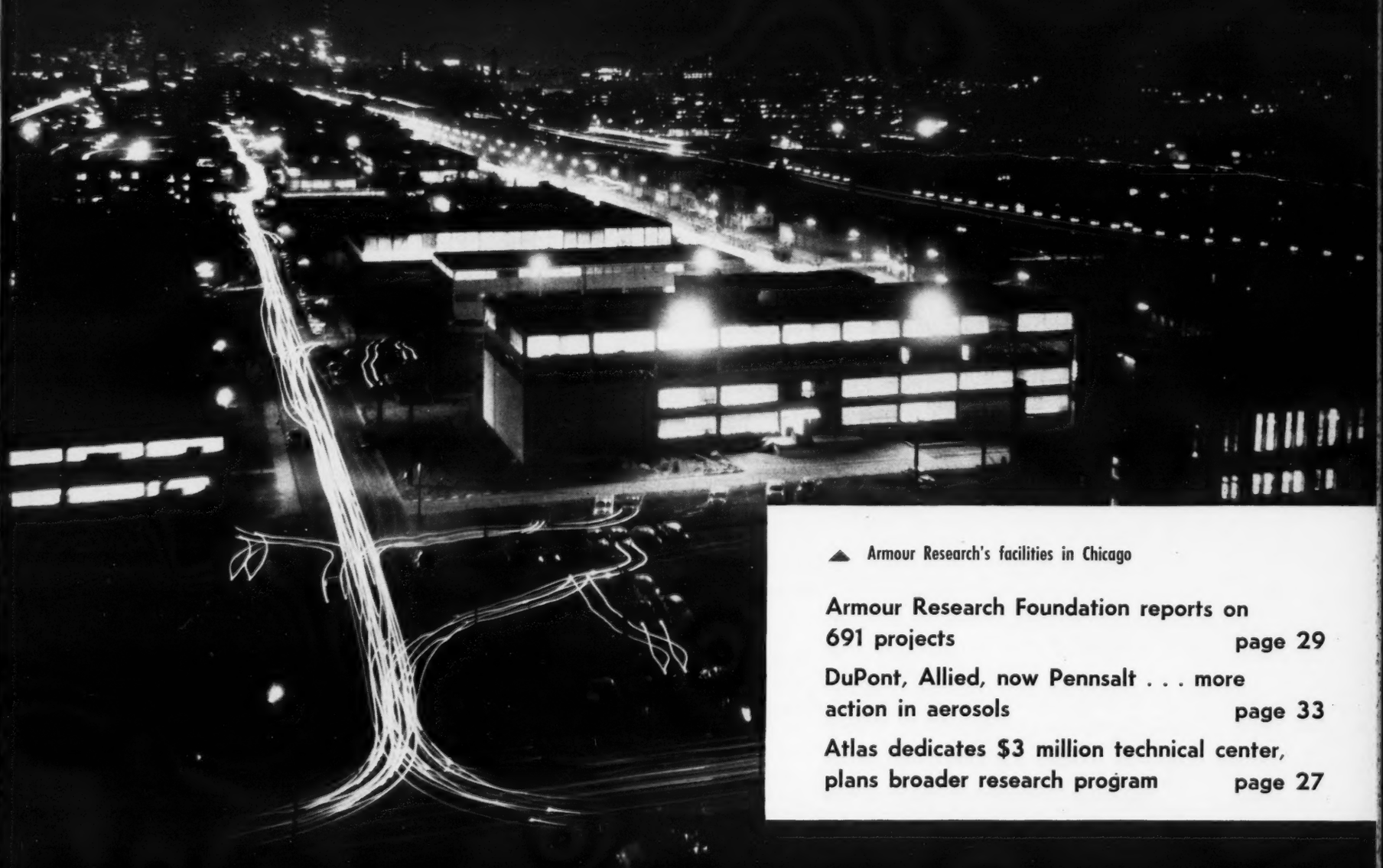
May 8-11. Fluid Controls Institute, meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

May 12-16. The Electrochemical Society, Inc., meeting, Hotel Statler, New York.

May 13-14. Commercial Chemical Development Association, resort meeting, French Lick, Indiana.

chemical business

Trends in the chemical world . . . what they mean to you as reported by the editors of CHEMICAL PROCESSING



▲ Armour Research's facilities in Chicago

Armour Research Foundation reports on 691 projects page 29

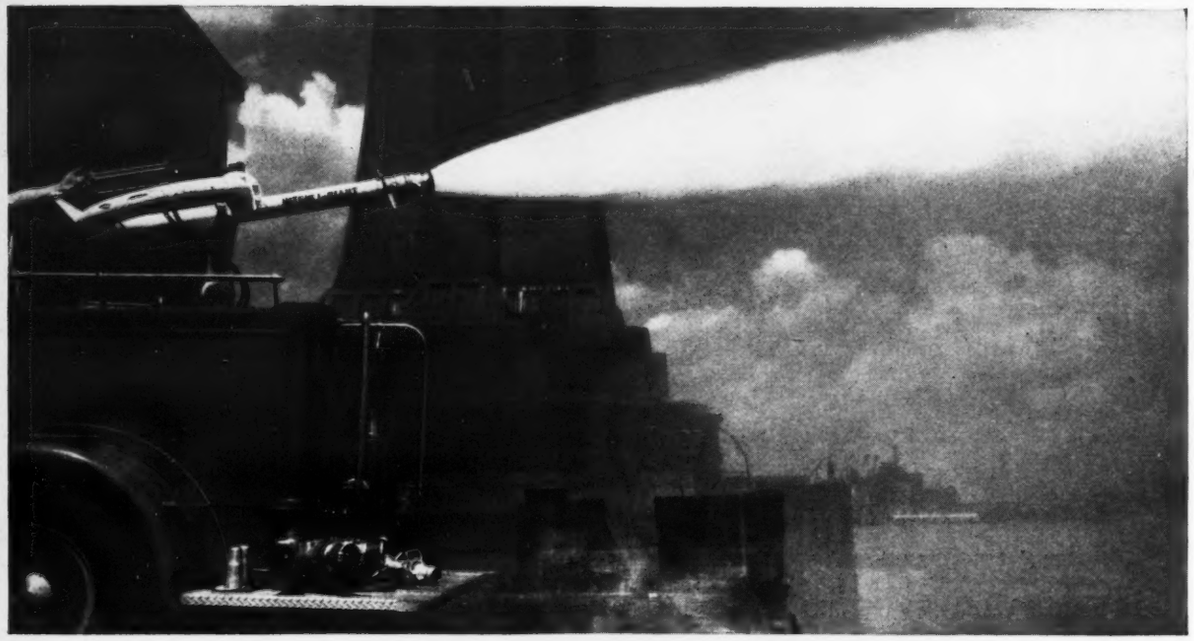
DuPont, Allied, now Pennsalt . . . more action in aerosols page 33

Atlas dedicates $3 million technical center, plans broader research program page 27

IN FIREFIGHTING—

CHIKSAN Intelli-Giant...

THE NEW BIG BERTHA OF FIRE SUPPRESSION



Capable of delivering a quenching 2,500 gallon per minute deluge, this latest development in master stream fire fighting equipment has a dramatically effective striking range of better than 320 feet in distance, a far-reaching 165 feet in height. Yet with all of its powerful striking force, one man seated at hydraulic controls has finger tip mastery of the Intelli-Giant at all times. Extremely versatile, the design of the Intelli-Giant makes it ideally suited for installation either on mobile equipment or as a fixed implacement in hazardous areas. "Modern Firefighting," a highly informative movie on the Intelli-Giant is available. Please write Chiksan, Brea, Calif. to arrange a showing.

Dispatched to combat a roaring mill fire on an island in the Schuylkill River, this Intelli-Giant, owned by the Philadelphia Fire Department, reached areas where conventional monitors could not. It prevented the inferno from engulfing 650 feet of the seven story building not yet affected by the fire.

Photos courtesy Philadelphia Fire Dept.

CHIKSAN

Please address: Dept. 173

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

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Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada Ltd.

When inquiring check 2046 opposite last page

chemical business

MARCH 1957
Vol. V No. 3

Highlights

Last Government butadiene facility ... will be up for sale without the previous production restrictions, if Rep. Carl Vinson's proposal is accepted by Congress ..... page 27

Atlas' technical center ... will make possible more applications research as well as an accelerated program of basic research. $3 million labs will provide facilities for the company's two new research departments . page 27

Armour Research ... winds up 20th year of operation, reports on 691 projects. Of interest to the chemical field: new floor tile material, data reduction research, market forecasting . page 29

Refined sodium CMC ... from new Du-Pont operation planned at Carney's Point, N. J., site. Production puts Du-Pont in competition with Hercules, previously only producer of the refined grade ..... page 30

Freons, Genetrons, now Isotrons ... and Pennsalt makes its bid for the even larger aerosol market predicted for the next few years. And new emulsifying systems are described by Du-Pont and Allied ..... page 33

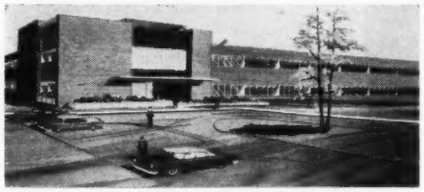
■

More research for Atlas

With an eye to "moving new discoveries from the lab bench into profit-producing outlets in the shortest possible time," Atlas Powder broke ground for its new $3 million research center adjacent to the company's general offices near Wilmington, Del.

According to Atlas president, **Ralph K. Gottshall,** the new technical center is the latest step in the current expansion of the Atlas research and development program, which includes an intensification of long-range research as well as applications research and customer service.

Housing two newly formed research groups, chemical research and product development, the center will provide



Atlas' $3 million technical center

facilities for work across the entire range of Atlas products, sorbitol, emulsifiers, detergents, polyester resins, activated carbons, and explosives.

Under the new arrangements, the company's long-range and basic studies will be done by chemical research, a new department headed by **Walter H. C. Rueggeberg.** Product development, the other new section, will be headed by **F. Faxon Ogden,** who will direct his efforts toward new Atlas products and markets.

Although Atlas sales have more than doubled in the last ten years ($32 million in 1946, $66 million in 1956), the company is "aiming at broad diversification leading into new markets. This volume would be on top of our present marketing."

"Although Atlas has been in chemicals for some time, more or less as a sideline," Gottshall explains, "the sideline has become a sizable portion' of the company's business. Our chemicals business has been pretty much of a specialty — tailored to fit end-uses. In the not-too-distant future the company plans more and better products and services, both for the many markets served by the company, as well as for new markets which may grow out of research."

Another boost for water-based paints

With sales booming, it seems that there is already a seller's market for water-based paints. Among the major advantages: non-flammability, simpler application with resultant cost cuts.

Now, researchers have turned to another side of the water-based paint picture . . . coatings for metals.

On page 36 CHEMICAL PROCESSING tells how Dow overcame the tricky problem of putting water on ferrous metals and not suffering the consequences of rust. Adhesion, too, was a problem but by judicious use of a molecular cross-linking phenomenon they also licked this one.

Coatings formulated with Dow's experimental latex X-2566 actually turn an apparent disadvantage into an advantage. Under 250-350°F heat and slightly acidic conditions, iron in the substrate goes into solution, and there the ions act as a cross-linking catalyst.

"The Case of the Last Rubber Plant"

The end of another Government-chemical industry hassle might be in sight if a bill offered by Rep. **Carl Vinson** (Dem., Ga.) gets the nod from Congress. Vinson, Chairman of the House Armed Services Committee, has recommended sale of the last butadiene facility owned by the Government without the buyet's guarantee that it will be used for rubber production.

Although operated currently by Publicker Industries, the plant has long been eyed by "a number of chemical companies," notably Union Carbide, who was on the verge of buying the property last year. The sale, however, was blocked when UCC wouldn't agree to continue butadiene production.

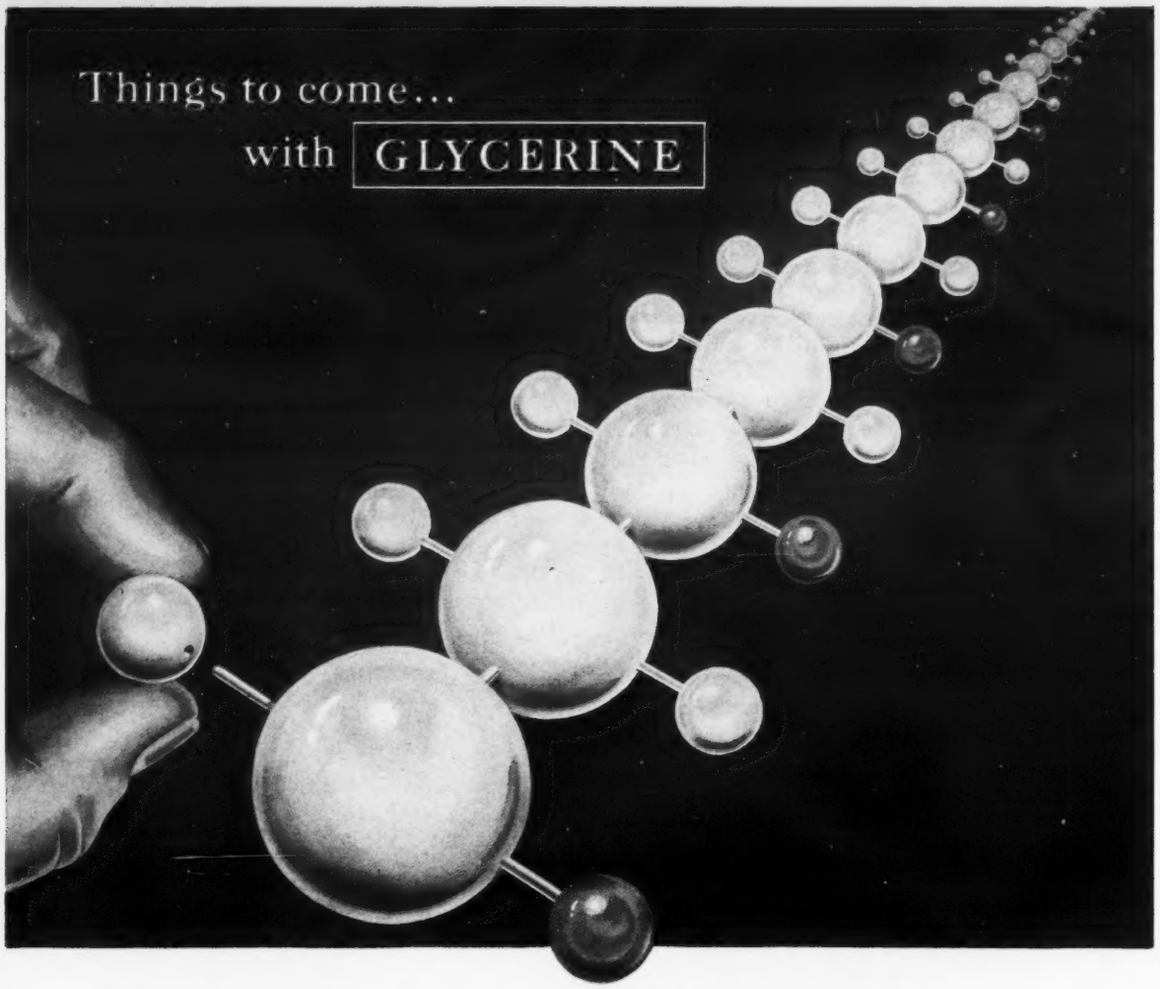
In previous sales of other wartime synthetic rubber properties, this condition has been mandatory.

Under the Vinson proposal, which is endorsed by Federal Facility Commission Administrator **L. B. Robbins,** a buyer would be free to produce any chemical or other product he might choose. And he would not be required to return the facility to synthetic rubber production if a national emergency arises within ten years after the sale. Robbins has formally asked Congress to schedule a second round of industry purchase bids for the Louisville plant. The FFC chief said he was recommending sale because he was unable to rent the plant for a long term during negotiations which collapsed early in December.

"Since neither the Publicker Industries bid nor that of Union Carbide assured the Government the return which the corporation thought should be received," he said, "the only alternative was an attemp to sell without the product or national security requirements."

Tax benefits

The Office of Defense Mobilization has closed out its expansion goals — and tax benefits — on six defense-related industries — taconite (low grade iron ore), commercial aircraft production facilities, plants to produce alkylate (aircraft fuel), heavy steel plates, and facilities to process titanium.



New way to get heavier, faster-linking vinyl polymers

A new development* employing Glycerine to speed up the formation of high-molecular-weight vinyl polymers holds out the promise of plastics with new and unusual properties.

The process makes use of Glycerine's ability to increase the true, or *local*, viscosity of the solvent. This increased local viscosity acts to suppress the termination step of the polymerization reaction. Of all the thickening agents tested, only Glycerine had this effect.

The reaction brought about with this new process is claimed to yield polymers with molecular weights far in excess of those obtained by conventional methods. Work is under way to develop commercial possibilities of these new polymers.

*Developed by Dr. G. Oster, Polytechnic Institute of Brooklyn

Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers processors a unique balance of properties: It is hygroscopic, nontoxic, stable, nonvolatile, with excellent solvent power and agreeable taste. New applications for Glycerine are extending its use in paints, foods, pharmaceuticals, packaging and many other fields. For a handy 20-page booklet, "Glycerine Properties and Uses," write to:

Glycerine Producers' Association

295 Madison Avenue, New York 17, N. Y.

Nothing takes the place of Glycerine

When inquiring check 2047 opposite last page

CCDA's annual open meeting

. . . is being held March 28 at New York's Statler Hotel. The list of speakers, while not yet complete, includes CCDA President **F. S. Swackhamer, Dr. N. B. Sommer,** General Chairman, Koppers' **John Poole Sr.,** Naugatuck Chemical's **Martin J. Tierney,** Cyanamid's **G. W. Larson,** and Hercules' **Robert W. Cairns.**

Chemical marketing group

. . . for Pittsburgh area people is being formed by commercial staff men from chemical companies in Pittsburgh area.

Providing a local forum for chemically-oriented men to meet with others of similar professional interests, the group now comprises about thirty members. Membership applications are being received by the membership chairman, **John Corwin** of Koppers Co.

Chemical suppliers

. . . to canning industry have an increasing market. Information on extent is furnished by 1955 crop data. Five-sixths of the nation's commercial planting of seven major crops went to the processing industry — canning, glass packing, and freezing — with only one-sixth being sold as fresh produce. Crops were lima and snap beans, beets, sweet corn, peas, spinach, and tomatoes.

"It's time to stop kidding ourselves . . . we've got to find ourselves a merger deal."

Armour Research reports on 691 projects

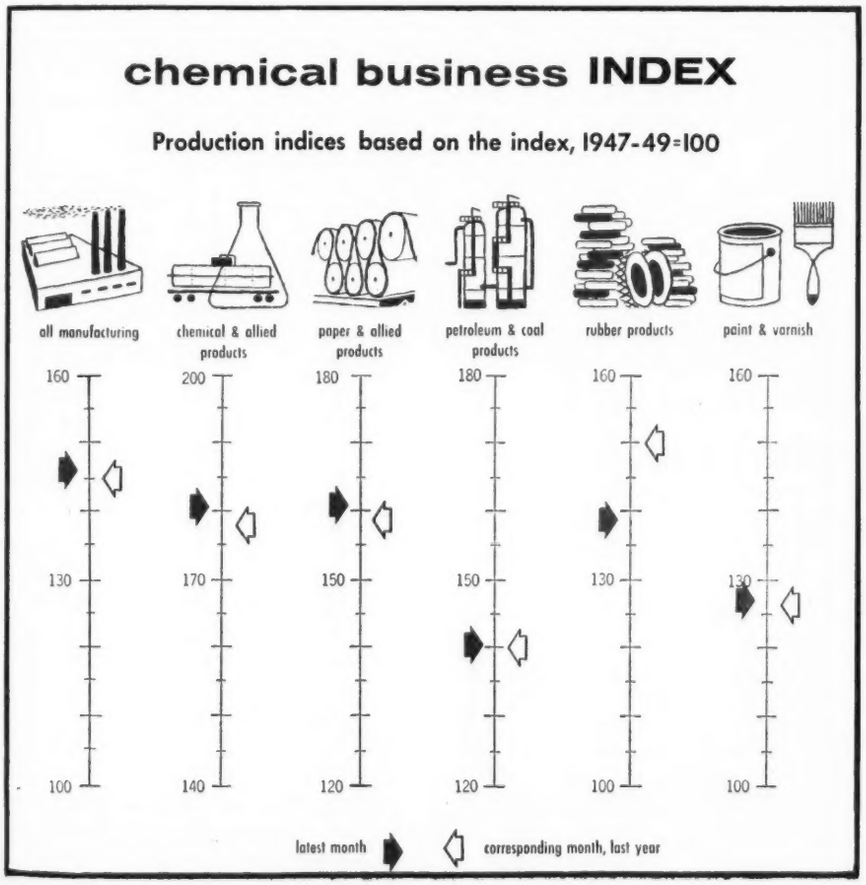
Winding up its 20th year of operation, Armour Research Foundation has issued reports on 691 research projects — $12 millions worth — for both private industry and government.

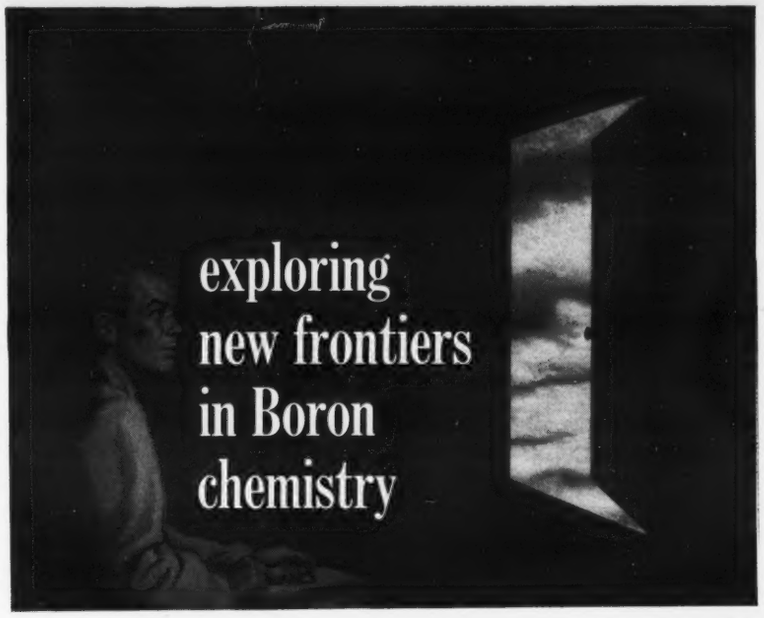
Typical of the studies interesting to chemical people: stabilization of slurries, drying of inks and paints, an analytical study of tall oil.

Among other projects taken on by the staff of 1237 during the year:

- Development of an electrically conductive floor tile composition. Planned for use where sparking might be a serious hazard, the tile "combines excellent density and wear resistance with moderate cost."
- Continued support of a research program directed toward enhancing desirable characteristics and determining some physical properties of non-metallic nuclear materials.
- Design of elements for a tank farm data reduction system to be incorporated with other measuring devices. System has facilities for storage of data for 100 tanks, each tank requiring approximately 5000 five-digit numbers for its description.
- Forecasting market requirements and relating them to facilities planning. In this study, future needs for specific materials were evaluated. The capital and operating cost data for facilities to produce the materials supported an analysis to determine the most economical means of meeting forecasted requirements.

The 1956 Annual Report is published by the Armour Research Foundation, 35 West 33rd Street, Chicago 16, Ill. If you'd like to see the complete report, check 2048 on Reader Service slip opposite last page.





Latest addition to Trona's* growing list of boron intermediates... boron halides...

do they have a place in your product's future?

Boron Trichloride

Boron Tribromide

You might benefit from TRONA's own basic research in these highly reactive compounds, BBr_3 and BCl_3, versatile as raw materials in the production of *elemental boron* and boron hydrides, as well as a variety of other uses.

Both compounds can be used in the refining of zinc, copper, magnesium and aluminum alloys to remove oxide, carbide and nitride from the molten metal. They have also been suggested as polymerization catalysts. BCl_3 has been proposed as a Friedel-Crafts condensing agent for organic synthesis, as a catalyst in inorganic reactions, and is particularly effective for the control of magnesium metal fires. It has been patented for stabilization of sulfur trioxide.

If you're concerned with the use of boron intermediates, write us today. TRONA's leadership in boron technology is your assurance of purity and uniformity to meet the most critical requirements.

Properties

BORON TRICHLORIDE

Molecular Weight	117.19
Theoretical Composition:	
Boron	9.23%
Chlorine	90.77%
Density, liq., 0°C/4°C	1.43
Boiling Point at 760 mm.	12.5°C
Melting Point	−107°C

BORON TRIBROMIDE

Molecular Weight	250.57
Theoretical Composition:	
Boron	4.32%
Bromine	95.68%
Specific Gravity, liq., 25°C/25°C	2.62
Boiling Point at 760 mm.	90.5°C
Melting Point	−46°C

TRONA

MARKET DEVELOPMENT DEPARTMENT

American Potash & Chemical Corporation

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99 Park Avenue, New York 16, New York

*TRADEMARK AP&CC

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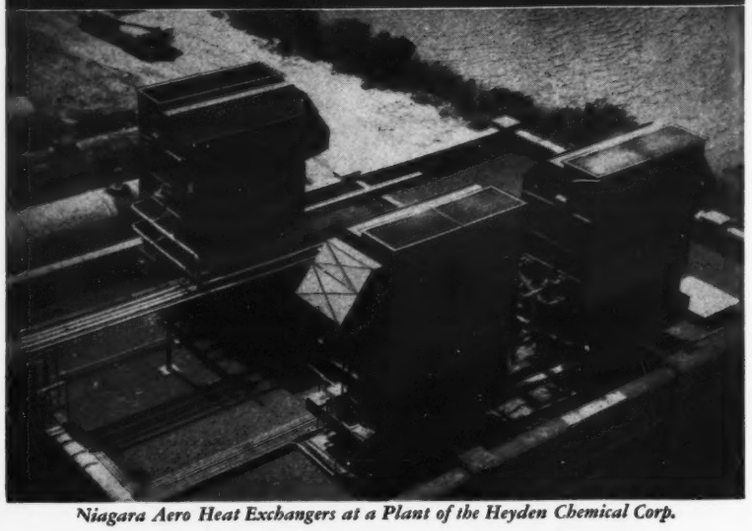

Niagara Aero Heat Exchangers at a Plant of the Heyden Chemical Corp.

Get Better Control of Distillation Product

● Liquid or vapor temperatures are always held constant by the Niagara "Balanced Wet Bulb" control method of evaporatively cooling or condensing, which automatically varies the cooling effect proportionately to the load. The distillation product is therefore uniform throughout all changes in climatic conditions the year around; it is the same in the heat of summer as in the freezing cold of winter. Continuous maximum production is thus insured.

Non-condensibles are effectively separated at the condensate outlet, with notable sub-cooling after separation for greater vacuum pump efficiency.

NIAGARA AERO HEAT EXCHANGERS give sustained full capacity in cooling and condensing with no dependence on cooling water . . . eliminating problems of water supply, availability, temperature, or quality.

For full information write for Bulletin 120

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When inquiring check 2050 opposite last page

chemical business — Our Growing Industry

DuPont plans refined CMC operation

Making a jump into a field previously dominated by Hercules, DuPont has released plans for construction of new faclities to produce refined sodium carboxymethylcellulose. Plans call for the new unit to be built at the company's Carney's Point, N. J., operation, where technical grade CMC is now produced.

The new plant will also accommodate DuPont's present technical CMC production (also made by Hercules, Wyandotte, and P&G's Buckeye Cellulose). Existing facilities will be dismantled when new operation is complete.

A real growth chemical, CMC's production has increased twelve-fold over the past ten years (1956 production was just under 30 million pounds). The refined grade, known generally as cellulose gum, finds its greatest outlet in food products, notably ice cream. Major use of the technical grade material is in soaps and detergents, although large quantities go for such things as oil-well drilling muds, and to paper, textile, and paint makers.

$17 million butyl rubber

. . . unit is announced by Petroleum Chemicals Inc. To be built at Lake Charles, La., the operation will have an initial capacity of 30,000 tons yearly, can be expanded by 50 percent later.

According to PCI's president, **Bruce Brown,** the plant is the first butyl rubber unit to be built since the war, and will increase national capacity by about one-third. Raw material will come from hydrocarbon streams at the Lake Charles refineries of Cities Service and Continental Oil, owners of PCI.

Doubled morpholine capacity

. . . will result from Carbide and Carbon's facilities expansion at South Charleston, W. Va., according to v-p **E. E. Fogle.**

To be completed in 1957, the unit is an integral part of a synchronized program of expansion in ethanolamines and ethylene oxide. A new ethanolamine unit has been completed at the company's Seadrift, Tex., plant, and Carbide's new ethylene oxide, ethylene glycol, and polyethylene plant is now on-stream at Torrence, Calif.

Acrylic acid esters capacity

. . . at rate of 15 million lb per year is goal of Celanese Corp.'s new plant at Pampa, Texas. Main items will be methyl, ethyl and butyl acrylates. New facilities represent latest step in their chemical expansion program. Alcohols and other materials produced by Celanese will provide the raw materials.

On the other hand

. . . New England is getting some of the plastic business with the announcement of two new plants going into production in that area. Borden Company's chemical division has completed its polyvinyl chloride resin plant at Leominster, Mass. Geared to produce 12 million pounds per year, the plant is nearly 100% automated.

Ethylene glycol

. . . an annual eight million gallons of it, will be flowing from Calcasieu's $11 million petrochemical operation to be built and operated by Petroleum Chemicals at Lake Charles, La. Most of the production will be earmarked for marketing by three principal stockholders, Cities Service, Continental Oil, and Sears, Roebuck.

The plant will be located adjacent to the ethylene plant now under construction by PCI.

Vinyl plastisols patent

. . . is being licensed by Union Carbide and Carbon through Carbide and Carbon Chemicals Company. License agreement will allow plastics manufacturers to make, use, and sell vinyl plastisols containing Monomer MG-1. Results of an extensive research program on vinyl plastisols will also be made available. Plastisols based on MG-1 produce resin with a hardness range not previously possible with conventional plasticizers.

For the second time

. . . within a year, Texas Eastman has increased polyethylene production . . . this time to an annual 55 million pounds. And to add to the more than bustling PE picture, Allied has revealed plans to start commercial production of a high-density material, supplementing its conventional polyethylene production.

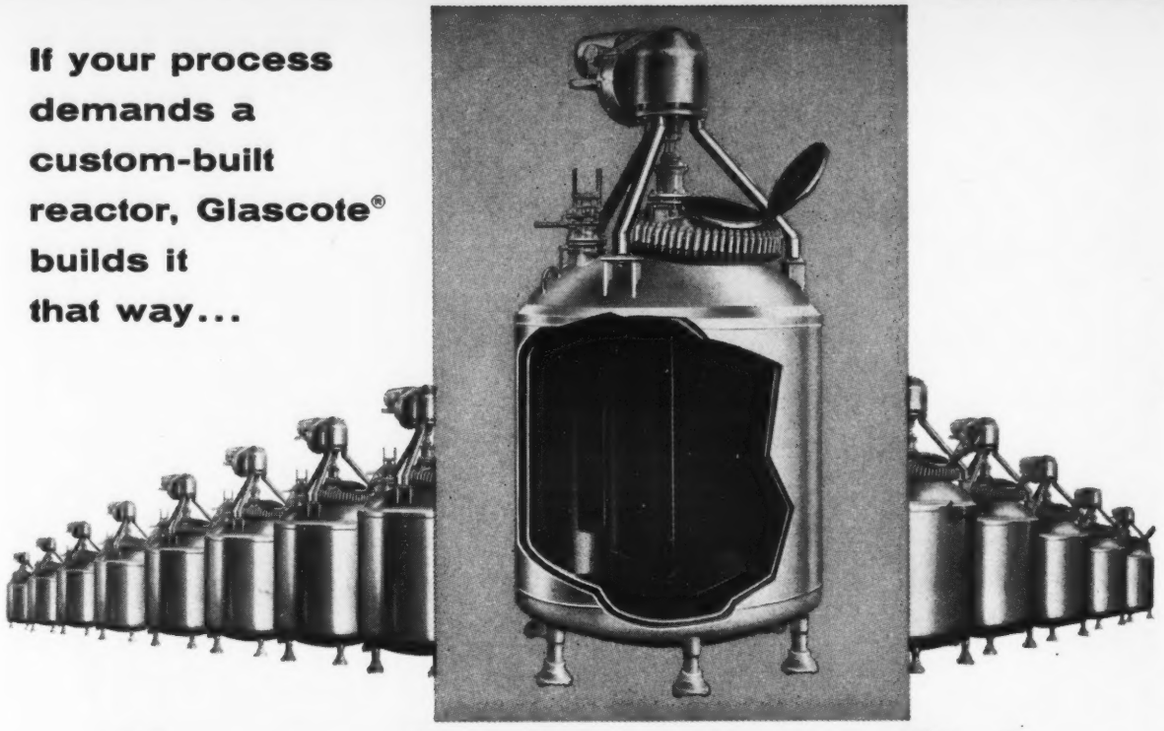
"Small" business

. . . has been redefined by Government procurement offices. Under the new ruling, a business enterprise with fewer than 500 employees will not be considered small if dominent in field of operation. Also, a relatively small business enterprise primarily engaged in industry characterized by large number of employees may be certified as small business even if it has more than 500 employees. Previous definition set an arbitrary limit that all firms with 500 or more employees were large and not entitled to small business status.

Growth in present markets

. . . has dictated Shell Chemical's decision to triple their Epon resin production. New production level was reached with the construction of two units at Houston plant. One will produce liquid grades and the other, solid grades of resins. Previously liquid and solid grades were produced alternately.

If your process demands a custom-built reactor, Glascote® builds it that way...



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AVAILABLE IN A RANGE FROM 300 TO 2000 GALLON CAPACITIES

Our standard one-year guarantee continues to apply to all Glascote glass-lined products.

GLASCOTE has accelerated its reactor production to include standard designs in the HR (heavy-duty closed), CR (clamp-top) and SR (standard closed) series reactors.

Outstanding features include Glascote's exclusive leak-proof mechanical seal, glass-coated agitator and baffle. Whether it's blending, mixing or gas absorption, here's a surprisingly economical way to enjoy the superior characteristics of Glascote acid-alkali-resistant glass lining, for *all types* of corrosive processing. Sets new standards in product purity . . . longer equipment life.

Glascote also gives you non-stick glass linings for polymer production. And of course, Glascote will continue to make custom-built reactors in capacities to 4000 gallons and larger. Internal and jacket pressures to meet your exact specifications.

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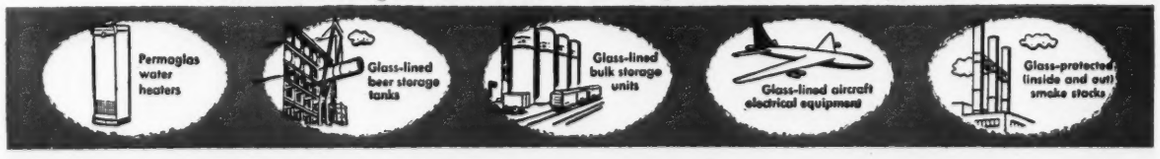
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Glass-lined beer storage tanks
Glass-lined bulk storage units
Glass-lined aircraft electrical equipment
Glass-protected (inside and out) smoke stacks

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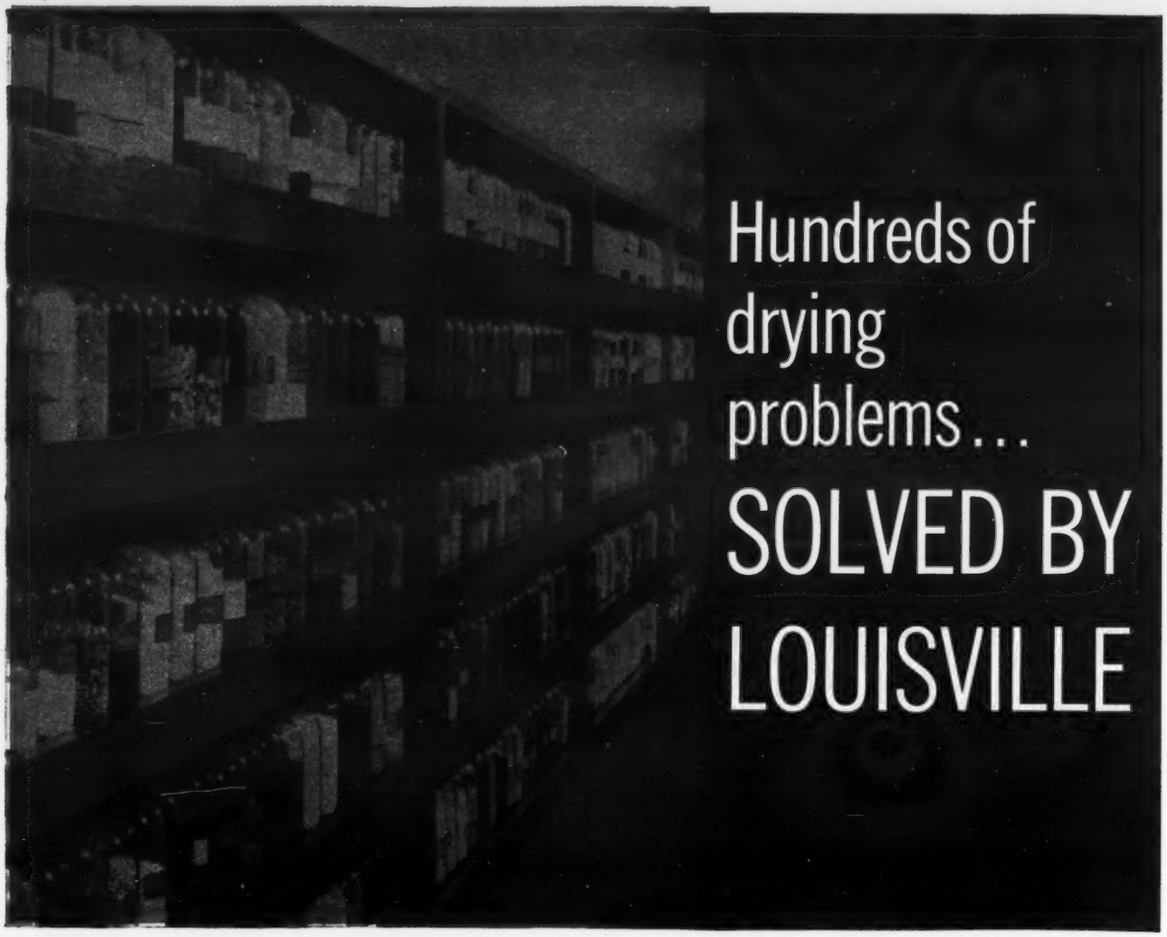

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Only Louisville Dryers dry so many things so well. Sounds boastful, but only Louisville has the diversified experience... the facilities and the personnel to design and build dryers that are right for so many jobs.

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General Offices: 135 So. La Salle Street, Chicago 90, Illinois
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada

When inquiring check 2052 opposite last page

"There's no business . . ."

. . . like the trade show business, according to a booklet recently published by Poirot Exhibitors Service, a Chicago display handling organization. Pointing up the hazards of "do it yourself" show operations, Poirot explains that servicing a show, to say nothing of transportation and such, has become something of a science these days.

If you'd like to see a copy of the booklet, write Poirot Exhibitors Service, 2001 West Pershing Road, Chicago 9, Ill., or check 2053 on form opposite last page.

Option on experimental farm

. . . has been exercised by Union Carbide and Carbon. Reasoning behind such a deal is to afford a method of cutting testing times in their experimental work on agricultural chemicals. Immediate use will be to test UCC's Crag brand synthetic pesticides. Location chosen is a tract of land 17 miles southeast of Raleigh, N. C. This puts them in position of being closely associated with three North Carolina research institutions — Duke University, University of North Carolina, and North Carolina State College.

DuPont has announced

. . . grants of more than $1 million to 122 colleges and universities in its annual program of aid to education. The grants, more than half of which are earmarked for teaching improvements, have been increased over last year's by more than $100,000.

The increasing student population in the Nation's schools, DuPont feels, has made the maintaining of educational quality, while developing enough new teachers, a major problem. The lion's share of the grants have been tagged to alleviate this situation.

And although the purpose of the money has been defined, DuPont is leaving decisions on the detailed use of the funds to the schools themselves.

Aerosol propellant makers push research; begin to show results

Recently stepped-up research activity by the major aerosol propellant producers has begun to show results, according to announcements by DuPont and Allied's General Chemical Division. Both have described emulsifying systems which permit a wider range of aerosol products; both predict greatly increased sales for the whole aerosol industry . . . something like 600 million annual units by 1960.

DuPont chemists explain that the new system will permit aerosol packaging of water-based solutions and ingredients not strictly soluble in commonly used propellants.

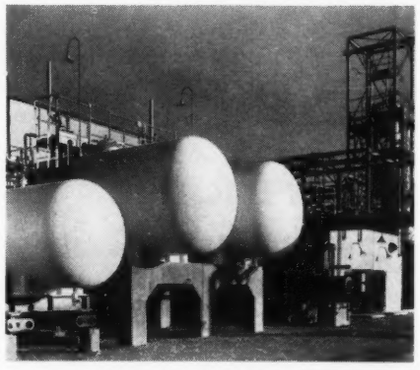
Although a few water-base products, such as shaving cream, have been adapted already to pressurized packaging to give a foam discharge, the new system permits a wider range of discharge patterns, varying from soft, space-type sprays to wet, residual-type sprays. Other advantages, of particular interest to pharmaceutical and cosmetic people, include the development of formulations which create no undesirable cooling when applied to the skin and which are capable of depositing active ingredient coatings not readily removed by washing.

Previously, emulsion products have been oil-in-water systems where the propellant is dispersed in the aqueous phase. DuPont's system is based on water-in-oil emulsions where water in the final formulation is dispersed in the propellant. Such systems use oil-soluble, surface-active agents which tend to produce less foam upon spraying than do water-soluble agents. The oil phase may consist of propellant alone or a mixture of propellant and hydrocarbon oil, such as odorless mineral spirits or deodorized kerosene.

General Chemical's system differs from DuPont's in that it involves the dispersing of the usually water-insoluble propellant in water with the aid of low-cost detergents, instead of using more expensive co-solvents.

Advantages of the system, General explains, are lower cost, reduced propellant needs, and constant pressure.

Perhaps adding considerable impetus to the propellant maker's activity was Pennsalt's announcement a few months ago that they, too, were getting into

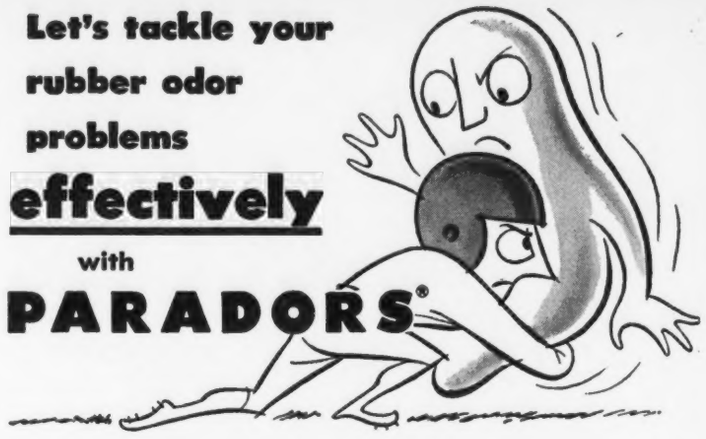


A portion of Pennsalt's Isotron plant

the propellant business. The company's Calvert City, Ky., plant is now complete and Pennsalt's president, **William P. Drake**, explains that a second unit is under construction and will be completed sometime this year. And a nation-wide sales organization has already been set up to market the propellants, called Isotrons.

Main features of Pennsalt's new process are vapor phase catalytic converters which produce the Isotrons from hydrofluoric acid and carbon tetrachloride feed materials. Major components of the plant are its distillation and drying systems designed to meet necessary purity and exacting moisture control requirements.

Let's tackle your rubber odor problems effectively with PARADORS®



Neutralizing objectionable odors in rubber is a job for experts . . . and we are pioneers in this field. Our PARADORS are designed to solve your rubber odor problems effectively, economically. They are stable under all processing conditions, compatible with all types of rubber ingredients, will not affect the properties of your finished product . . . and are suitable for plastic application as well. Their concentrations can be controlled to give exactly the right odor reduction or add a pleasant scent if desired.

May we send you samples of PARADORS and put our experience to work for you?

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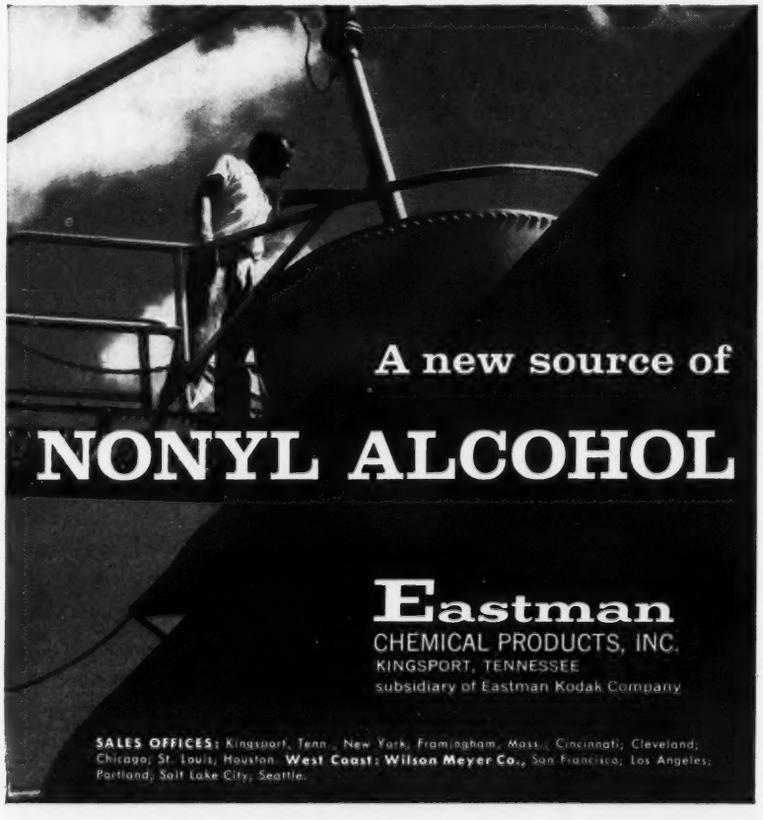
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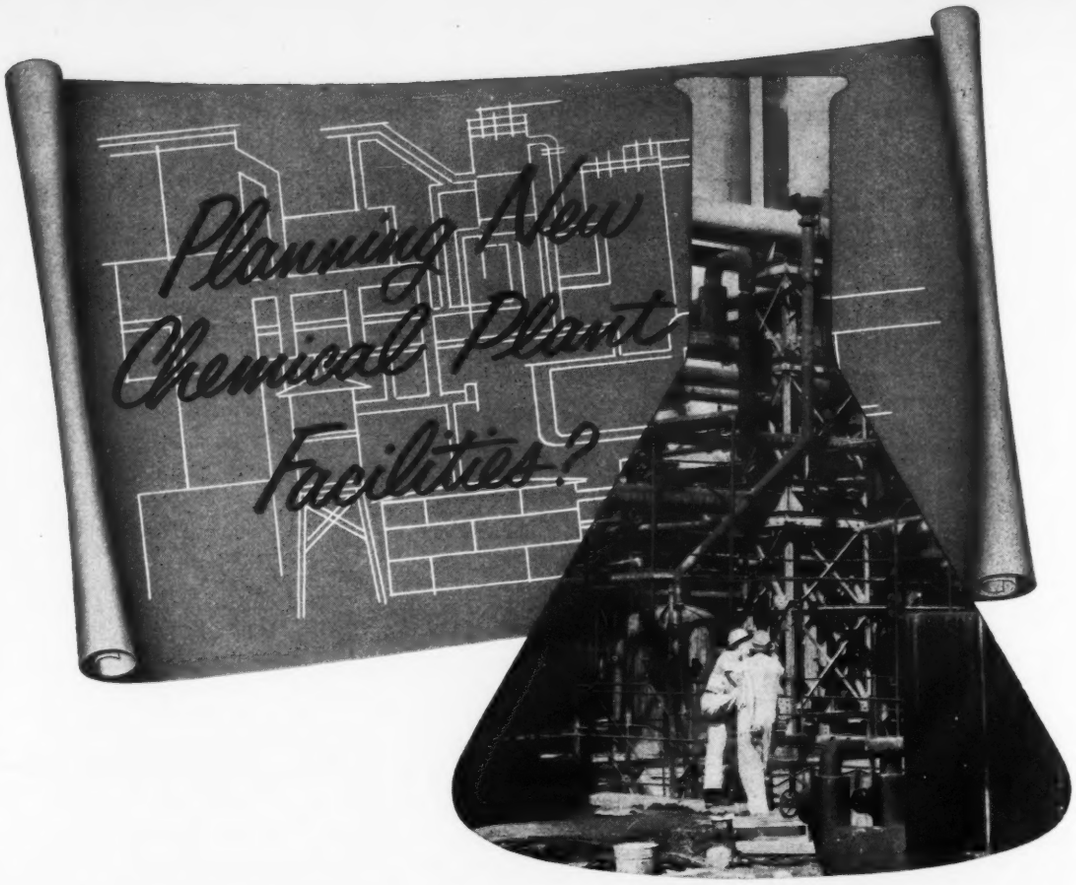

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PITT CHEM *Tarset* is one of the most valuable and practical protective coatings ever developed for combating severe corrosion conditions of the type you may encounter in your chemical plant. Consider these unique advantages:

1. *Tarset* combines two proven corrosion fighters—coal tar pitch and epoxy resin.
2. *Tarset* is unusually resistant to most alkalis, acids and salts.
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What can Tarset do for you? If you have a stubborn corrosion problem—perhaps in a storage tank, an acid bath, or similar equipment—*Tarset* may be able to extend the life span of your equipment and eliminate costly down time needed for repairs or replacement. We'll be glad to send you complete technical data and samples for testing. Write today!

Send for Descriptive Booklet on TARSET today

Free booklet tells how to use amazing new Tarset to reduce costly corrosion. Gives detailed description of Tarset's specifications, properties and application characteristics. Write for your copy today!

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New line for Dow

Introduced as "first in a new Dow family of such materials," a vinylidene chloride lining for processing equipment (tradenamed Saraloy 898 is being marketed by Dow's Saran Lined Pipe Company.

"The material," says Dow plastics department sales manager, **D. L. Gibb,** "has resistance to a broad range of acids, alkalies, salt solutions and solvents commonly encountered in storage tanks, processing tanks, pipes and fittings, and fume ducts and hoods."

The material can be installed in the field or plant with adhesives and needn't be vulcanized after application, he explained.

"Our Next Five Years

. . . of Competition With the Foreign Chemical Industry" is the subject to be pursued at the upcoming Chemical Market Research Association meeting to be held March 12-13 in Philadelphia.

Groups will tour Allied's Barrett Division coal tar chemicals plant, Smith, Kline and French's operation, and Scott Paper.

Among the papers to be presented: World Chemical Map, Patterns of Competition from Foreign Chemicals, What Every Market Researcher Should Know to Study Foreign Markets.

Sodium and calcium phosphates

. . . received price increases ranging from 25 to 30 cents per hundredweight effective January 1, 1957, by Monsanto. Increased raw material prices during 1956, particularly for lime and soda ash used to manufacture calcium or sodium phosphates, were reasons given.

CB goofed

. . . in the January issue when it identified **W. S. Richardson** as President of the B. F. Goodrich Chemical Company. Mr. Richardson is, of course, President of Goodrich Chemical's parent organization, B. F. Goodrich Company.

chemical business

Spotlight on people

Along with the new association of Allied's Mutual Chemical Division and Solvay Process Division for general administrative purposes' **George B. Wemple,** a Mutual Chemical vice president, becomes a vice president of Solvay Process. Also at Allied . . . **William J. Urbowicz** is named product manager of alicyclic chemicals at National Aniline Division.

Dr. Clarence A. Steigman is named director of production development for Hooker Electrochemical.

Newly formed consultant firm, Calkin & Bayley, Inc., is headed by **John B. Calkin,** a member of CHEMICAL PROCESSING's Editorial Advisory Board. **George T. Bayley** is holding position of executive v-p.

Calkin

News at Archer-Daniels-Midland . . . new position of assistant to resin and plastics division manager is held by **W. C. Mueller, E. W. Kaufmann** is sales manager for resins, and **Fred J. Burnett** is made sales manager for industrial resins.

Nelson

Dewey H. Nelson, former assistant to sales manager, is promoted to sales manager of Becco Chemical Division of Food Machinery.

At Diamond Alkali . . . **Dr. U. T. Greene** holds newly created position of assistant director of commercial development.

R. E. Vidal is promoted to manager of resin sales at Dow Corning.

Manager of marketing research for Pennsalt's industrial division is **Arthur F. Bixby.**

H. E. Bramston-Cook is elected to board of directors of Oronite Chemical Company, chemical subsidiary of Standard Oil of California.

Robert C. Brumberger is appointed manager of chemical industry sales for Nuodex Products, division of Heyden Newport Chemical Corporation.

New department general managers for Borden's chemical division are **Raymond J. Lodge,** heading resins and chemicals department, and **Charles W. Smith,** Polyco-Monomer department.

Bruce M. Bare is appointed marketing manager of Atlas Powder's chemicals division.

New executive vice president in charge of corporate development at Pabst Brewing Company is **Dr. Thomas H. Vaughn.**

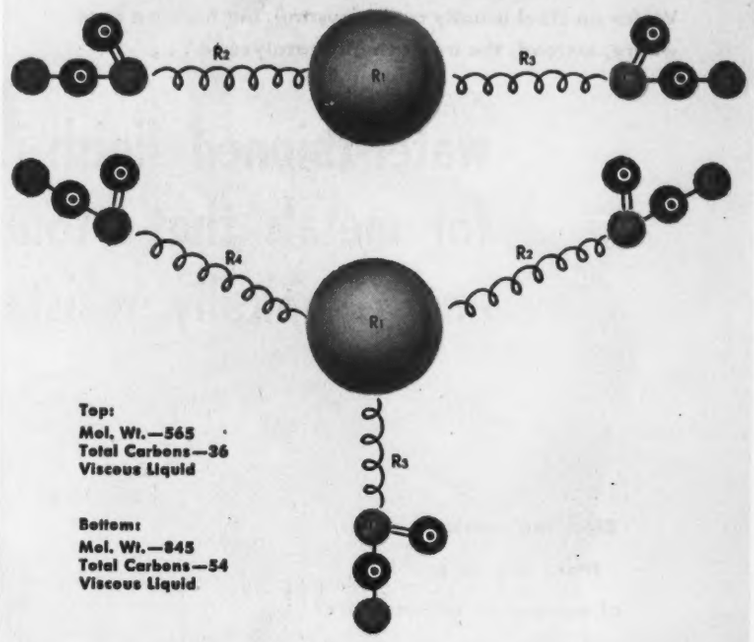
Vaughn

Four new vice presidents at Lithium Corporation of America are **Dr. R. B. Ellestad, Walter M. Fenton, J. Dean Herman,** and **J. D. Campbell.** Company also elevated **Willis W. Osborne** and **Fremont F. Clarke** to senior vice presidents.

Shawinigan Resins announces creation of two new posts with **W. H. Bromley** and **E. H. Finsilver** as general sales manager and assistant general sales manager respectively.

Allan J. Greene is elected administrative vice president and member of executive committee at Chas. Pfizer.

Want a Di- or Polybasic Acid that is DIFFERENT?



Then try EMPOL® POLYMERIZED ACIDS!

Relatively low in cost, these viscous liquids offer a very unusual combination of high molecular-weight and polyfunctionality that should be of extreme interest to manufacturers of resins, polyesters, polymers and similar type materials for many fields of application. Such fields already include adhesives, coatings, corrosion inhibitors, de-emulsifiers, emulsifying agents, films, foams, lube additives, elastomers and surface coatings.

In addition to commercial Empol 1022 which contains 75% dibasic and 22% tribasic acids, Emery offers several "development" grades that are essentially all dibasic or tribasic. This added flexibility of composition offers additional opportunities for research in new fields as well as the fields where the commercial product is already used. Mail coupon below for complete literature on Emery Polymerized Acids.

Emery Organic Chemical Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

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Please send literature on Emery Polymerized Acids. I am especially interested in ☐ dibasic, ☐ polybasic materials for.....
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City.....State.....

When inquiring check 2057 opposite last page

Water on steel usually causes rusting, but here's a case where, instead, the iron actually catalyzes a . . .

water-thinned finish for metals that's tough and chemically resistant

Since the thinner is water, there are no problems of toxicity or flammability

USES: In formulating baked industrial finishes for metal, such as auto and appliance primers and gloss and semi-gloss baked enamels. This latex provides the type of properties generally obtained with traditional solvent-type paints without the attendant problems of flammability and toxicity.

Features: It's been said that use of a water-thinned coating system on a ferrous metal substrate was an impossibility. Here's a case where, instead, iron ions actually catalyze the coating, giving excellent adhesion to the substrate with *no* rusting.

The water system has none of the hazards of an organic solvent system. The coating manufacturer

Table I

Effect of bake, pH, and catalyst on clear films of X-2566 on cold-rolled steel

	Pencil Hardness	Mineral Spirits Resistance (after 60')	Water Resistance (48 hr @ 25°C)
No catalyst, 4.0 pH			
250°F for 30'	4H	OK	F-Good
275°F for 30'	5H	OK	Good
350°F for 15'	5H	OK	Good
0.1% Co catalyst, 4.0 pH			
250°F for 30'	4H	OK	Good
275°F for 30'	4H	OK	Good
350°F for 15'	4H	OK	Good
No catalyst, 8.0 pH			
250°F for 30'	HB	Fail	V. Poor
275°F for 30'	H	Fail	V. Poor
350°F for 15'	H	Softened	F-Good
0.1% Co catalyst, 8.0 pH			
250°F for 30'	H	OK	Good
275°F for 30'	2H	OK	V. Good
350°F for 15'	4H	OK	V. Good

Table II

Comparison of baked clear films on cold-rolled steel

Vehicle	pH	Catalyst[1]	Bake °F	Adh. Knife	Flex. ⅛"	Impact (in. lb.)	Pencil Hardness	Min. Sp. 60'	Water Immersion (25°C) 1 hr	Water Immersion (25°C) 24 hr	Water Immersion (25°C) 1 wk	3% NaOH 1 hr	3% NaOH 24 hr	5% Acetic Acid 1 hr	5% Acetic Acid 24 hr
X-2566	4.0	NONE	275°/30'	Exc.	Crazed	< 2	5H	OK	OK	Sl. Wh.	Wh., Sl. Bl.	OK	OK	OK	OK
X-2566	8.0	.07% Co	275°/30'	Exc.	Crazed	< 2	3H	OK	OK	OK	Sl. Wh. Sl. Bl.	Sl. Br.	Sl. Br.	Br.	Br.
Acrylic Emulsion	9.0	NONE	350°/30'	Good	OK	>28	H	OK	Wh., Sl. Loss Adh.	Bad Wh. Loss Adh.	Bad Loss Adh.	Lifted	——	Wh.	Lifted
Polyvinyl Acetate Emulsion (Internally Plasticized)	4.0	NONE	300°/30'	Fair	OK	>28	4B	OK	Bad Wh. Loss Adh.	Bad Wh. Loss Adh.	Bad Loss Adh. Rust	Lifted	——	Loss Adh.	Lifted
Short Oil Alkyd Emulsion	7.0	.1% Co	300°/30'	Good	OK	< 2	F	OK	Wh., Sl. Loss Adh.	Bad Wh. Br.	Bad Wh., Br.	Sl. Soft	dissolved	Soft	Bl., Br.
Short Oil Soya Alkyd Resin	—	.03% Co	300°/30'	Fair-Good	OK	>28	HB	OK	Sl. Wh.	Sl. Wh. Sl. Loss Adh.	Wh., Sl. Bl.	OK	dissolved	OK	Loss Adh. Bl.
Medium Oil Soya/Tung Alkyd Resin	—	.03% Co	300°/30'	Fair-Good	OK	>28	HB	OK	Sl. Wh.	"	Loss Adh., Bl.	OK	dissolved	Very Soft	Loss Adh. Bl.
Short Oil Alkyd/Urea Formaldehyde Resins 90/10	—	NONE	300°/30'	Fair-Good	OK	>28	HB	OK	OK	OK	OK	OK	Badly Softened	Very Soft	Loss Adh. Bl.

Legend: Wh. — Whitened, Bl. — Blistered, Br. — Brittle, Adh. — Adhesion

[1]Metal Based on Vehicle Solids

Table III

Suggested formulation for an iron oxide auto primer

(Spray on bonderized steel to dry film thickness of 1.8-2.2 mils. Bake at 275°F for 30' and wet sand with #320 sandpaper. Apply topcoat enamel and bake at recommended temperature)

Pigment Dispersion:	Approximate Pounds per 100 Gallons
Water	103.0
Tamol 731 (25%)	3.0
Pure red iron oxide	69.0
China clay	69.0
Barytes	138.0
Ben-A-Gel	0.75
Surfynol 102 (20% in EtOH)	1.5
Grind through Morehouse mill to fineness of 5 - 6	
Let Down:	
Experimental Latex X-2566 (46% N.V.)	588.0
Triton CF-10 (50% N.V.)	5.5
Water-dispersible manganese (5% metal)	6.0
	983.75

Formulation Constants:		
Pigment:	Iron oxide	25%
	China clay	25%
	Barytes	50%
Binder:	Experimental Latex X-2566	100%
Pigment/binder, by weight		1/1
Solids by weight (%)		56
Weight per gallon (lb)		9.9
Viscosity #4 Ford cup (sec.)		13.0
pH (adjusted with NH_4OH)		9.0
Manganese metal/latex Solids (%)		0.1

Manufacturing Notes:

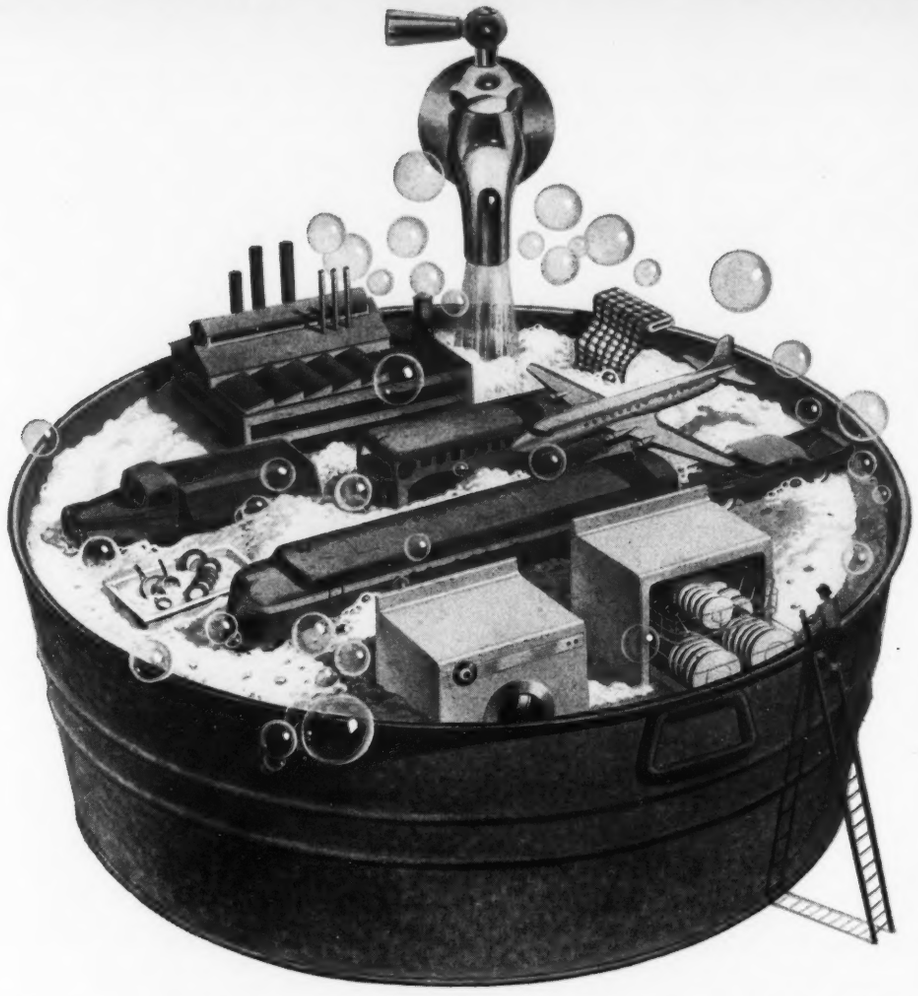
Add the latex to the pigment dispersion, followed by the Triton CF-10. After the Triton CF-10 is thoroughly mixed in, add the manganese catalyst

or user won't be confronted with dangers to plant or personnel caused by solvent toxicity or flammability.

The latex, a water dispersion of tough, high-mw resin particles, permits making a higher solids-content paint that results in greater film thicknesses per coating. Another advantage is in coating hot metal parts after flame cleaning. With the water-base paint, this can be done immediately after cleaning, thus reducing plant space requirements and speeding up the operation.

The system has good sprayability and, when formu-

(*Please turn to next page*)



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Water-thinned Finish

(*Continued from preceding page*)

lated properly, is suitable for dip application. On metal, baked films from coatings made from the latex have excellent toughness and adhesion, and have good chemical and water resistance.

Description: The latex is a stable, colloidal dispersion of high-mw styrene/butadiene resin particles in water. Heat and catalysts bring out the optimum properties of the coating as illustrated in Table I. Suggested formulations for both a primer and a one-coat enamel are given in Tables III and IV.

If a ferrous substrate is coated, the iron will catalyze the vehicle in an acid pH. It cross links the double bonds at the 250-350° curing temperatures.

When a non-ferrous substrate is coated or if a neutral or alkaline pH is used, then cobalt or manganese is added to the vehicle to provide the catalytic action. In effect, this action converts the thermoplastic resin, at least partially, to a thermosetting coating.

Table IV

Suggested formulation for a dark green gloss enamel

(Spray on metal. Allow to dry 15' and bake for 30' at 300-320°F. If coating is to be used on an iron-free substrate, add a metal catalyst)

Pigment Dispersion:	**Approximate Pounds per 100 Gallons**
Water	21.6
Tamol 731 (25% N.V.)	0.9
Surfynol 102 (20% in EtOH)	0.7
Chromium oxide	43.0
Grind 16 hours in pebble mill to fineness 7½ - 8	
Let Down:	
Experimental Latex X-2566 (46% N.V.)	742.0
Carbon black dispersion (20% N.V.)	8.8
Ceremul R (46% N.V.)	35.3
50 cp Methocel (5% N. V.)	20.0
	872.3

Formulation Constants:		
Pigment:	Chromium oxide	96.2%
	Carbon black	3.8%
Binder:	Experimental Latex X-2566	95%
	Ceremul R	5%
Pigment/binder by weight		1/8
Solids by weight (%)		46
Weight per gallon (lb)		8.7
Viscosity #4 Ford cup (sec.)		14
pH		5.4

Comparative physical properties of the baked clear films, given in Table II, compare very favorably to solvent-base coatings. In a salt spray test lasting 340 hours, a water-thinned primer based on this latex was comparable or slightly better than a commerical alkyd-type primer.

The latex is 46% solids and has a sp gr of 1.01. Latex pH is 4.0 ±0.5. Average particle size is 0.2 microns, Brookfield viscosity (@ 20 rpm and 25°C) is 29 cps, and surface tension is 34-38 dynes/cm at 25°C.

(Experimental Latex X-2566 is a product of Plastics Dept., The Dow Chemical Co., Midland, Mich. . . . or for more information check 2060 on form opposite last page.)

Odorless formaldehyde donor contains 19% formaldehyde

Uses: For modifying starch, textiles, fur, leather, paper and wood.

Features: Recommended as a formaldehyde donor in cases where odor of free formaldehyde is undesirable. Contains 19% combined formaldehyde which is capable of liberation.

Description: Monomethylol dimethyl hydantoin (MDMH) is offered as white crystals, with a melting point above 110°C. It is soluble in water, methanol and acetone. Heat alone produces liquid, soft or hard, water-soluble polymers. It reacts with proteins such as glue, gelatin, soybean protein and casein which are insolubilized.

(MDMH is produced commercially by Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N. Y. . . . or for more information check 2061 on form opposite last page.)

NEXT MONTH

survey of chemical materials introduced in 1956

Are annual listings of new chemical developments too long to wade through to really be of help? Not if all the items are indexed by their uses, as is done in CHEMICAL PROCESSING each year. Look in next month's Chemical Materials section for a thoroughly indexed descriptive listing of the more than 500 chemicals introduced last year.

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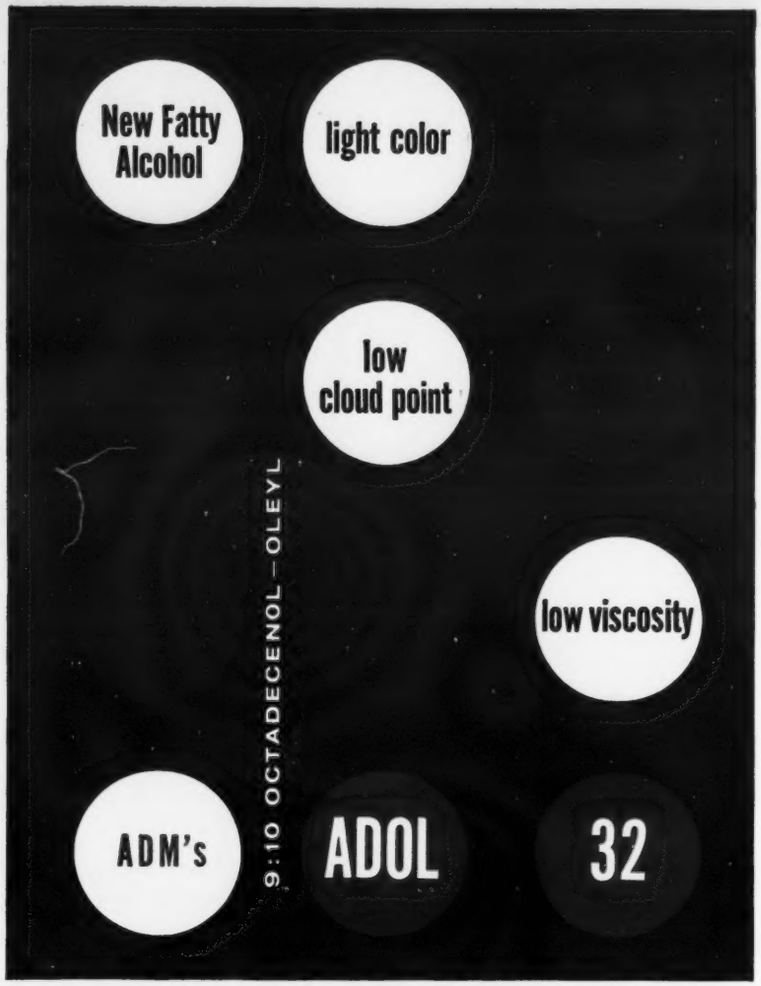

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These characteristics make ADOL 32 ideal as an emollient, a super-fatting agent, and a compound for detergents. Other possible applications—chemical intermediates, surfactants, soaps, germicides, emulsifiers, resins, plasticizers, textiles, lubricating oil additives, cutting oil bases and sulfonates.

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CHEMICAL MATERIALS

You can choose your own latex with this complete base for emulsion paints . . .

contains everything necessary (except latex and pigment) and doesn't require milling

Uses: For making butadiene/styrene or acrylic latex emulsion paints.

Features: Paint maker can choose the latex. Everything else that's needed to make the emulsion paint is in the base. All that is required for making paint is good agitation; no milling is necessary. By eliminating purchase and storage of as many as 13 separate items, and by eliminating as many as 90% of the usual manufacturing operations, the cost of the final paint is below private-label brands.

Description: The emulsion vehicle contains all emulsifiers, resin, wetting agents, deflocculants, defoamers, and preservatives essential to making a quality alkyd-modified latex paint, except the pigment and latex. Non-volatile is 38% ± 1% and wt/gal is 8.6 lb. The pH is 9.3 and there is 15% alkyd content (52R13 type). Base has the consistency of a heavy paste. Price is 20c/lb in 55-gal openhead drums.

(Unapex is a product of Naftone Inc., Dept. CP, 515 Madison Ave., New York 22, N.Y. . . . or for more information check 2064 opp. last page.)

Imparts desirable properties to polyurethane foams and alkyd resins . . .

trimethylolpropane produced with unusually high purity

Uses: In polyurethane foams and alkyd resins, and in explosives, heat-convertible polyesters, humectants, plasticizers, surface-active agents, and synthetic drying oils.

Features: In polyesters used for rigid or flexible urethane foams, trimethylolpropane (TMP) builds a more rigid molecule by cross-linking a linear polyester. Polyurethane foams are usually made by reacting a polyester with a diisocyanate. Hardness and heat distortion point of polyurethane resins are increased by TMP.

In alkyd resins, the primary advantages imparted by TMP are increased adhesion, better solvent compatibility, improved initial color and color retention properties, exceptional alkali resistance, and significantly increased hardness with flexibility. It is also possible to obtain more rapid alcoholysis rates in preparation of the resins.

Description: TMP is produced by aldol condensation of butyraldehyde and formaldehyde at company's Bishop, Texas, plant. Process gives a

alphabetical index on page 221

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 221. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

product of unusually high purity. As production volume increases, price should drop, making TMP even more attractive, especially in alkyd resins.

The TMP flakes have a minimum hydroxyl content of 37.5% (wt). Ash content is 0.01% (max) and water content is about 0.05% (max). Color of a 10% soln is 5 APHA (max) and acidity as formic is a maximum of 0.002%.

(TMP is a product of Chemical Div., Celanese Corporation of America, Dept. CP, 180 Madison Ave., New York 16, N.Y. . . . or for more information check 2066 on form opposite last page.)

All-vegetable adhesive gumming has high resistance to wash-off

Uses: For flat gumming operations, such as for trading stamps, stickers, labels and other products having remoistenable surfaces.

Features: All-vegetable adhesive gumming possesses advantages of dextrin-animal glue mixtures without undesirable odor and taste characteristics. It offers high resistance to wash-off if excessive water is used in reactivating gum. Long tack range is provided after remoistening.

Description: Dextrin is light in color and has high humidity and block resistance. It is compatible with other standard dextrins as well as many resin emulsions.

(Amioca 85 is product of National Adhesives Div., National Starch Products Inc., Dept. CP, 270 Madison Ave., New York 16, N.Y. . . . or for more information check 2067 on form opposite last page.)

Mixed phthalate ester plasticizer gives general-purpose versatility at attractive cost savings . . .

primary plasticizer for vinyl resins, plastisols

Uses: As a primary plasticizer for vinyl resins in film and extrusions and in plastisols.

Features: Compound provides good general-purpose versatility at attractive cost savings. It gives good overall performance and has good heat and light stability. The low fusion temp imparted by this plasticizer permits shorter fusion cycles in plastisol applications.

Description: Plasticizer is a mixed phthalate ester, having sp gr of 0.994 and a color of 30 Hazen (almost water white).

(Elastex 48-P is a product of Barrett Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y. . . . or form more information check 2068 on form opposite last page.)

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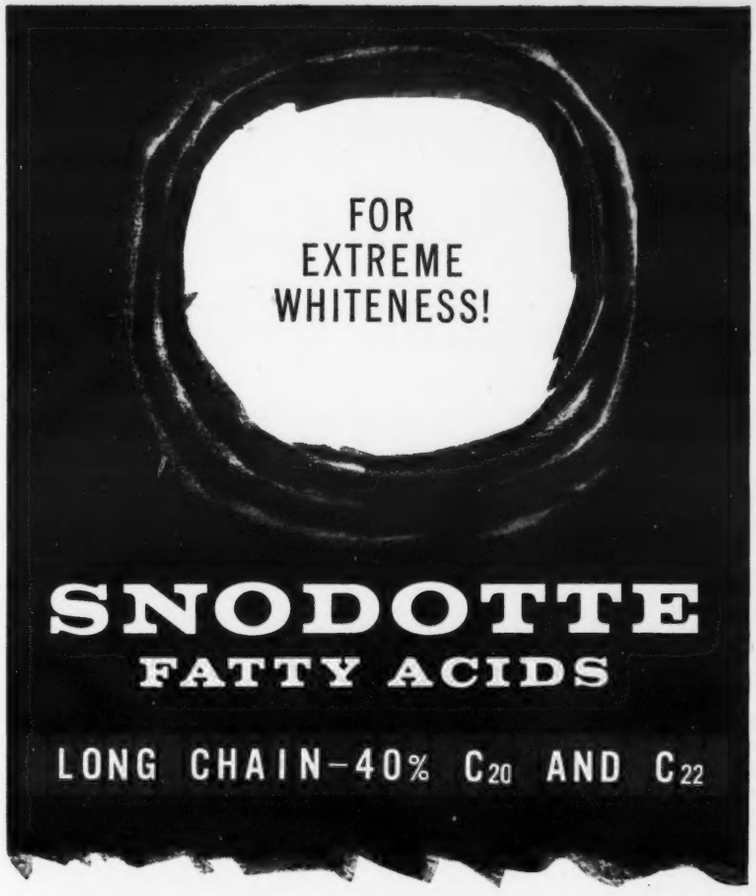

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Specific Gravity @ 100/25°C	0.832
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With a 3 maximum iodine value, SNODOTTE Acids give you products that won't darken or oxidize. With a maximum 10Y/1R Lovibond rating, you can visualize the extreme whiteness of SNODOTTE. It's a long chain acid (40% C_{20} and C_{22}) with excellent coupling qualities and contains no polyunsaturated acids. SNODOTTE is second to none for high quality aluminum stearates, lubricating greases and plastics. Write on your letterhead for a sample of SNODOTTE, along with full technical information.

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Researchers:

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Lithium metal, lithium hydride, lithium hydroxide and lithium carbonate are the basis for both experimental and commercial studies as polymerization catalysts in the manufacture of certain plastics, polymers and resins. The polymerization reactions may be "addition" or "condensation" processes.

This new research tool has tremendous potential. The use of lithium metal as a catalyst for the polymerization of diolefins has been known for many years. By contrast, lithium metal dispersions were only recently used to polymerize isoprene to a "natural" rubber.

Lithium carbonate, to cite another example, is a preferred catalyst for the esterification of tall oils. Again, lithium hydroxide has been found to be a superior catalyst for the manufacture of alkyd resins. And work has been done with lithium hydride for ester interchange reactions.

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More total production possible with self-starting P_4S_5 . . .

highly reactive phosphorus pentasulfide has unique properties as intermediate

Uses: As lubricant additives, thiophosphate insecticides, rubber additives, catalyst in blowing asphalt, stabilizer of aromatic amines, or intermediate in organic synthesis.

Features: With regular phosphorus pentasulfide, it usually is necessary to start a reaction by heating with alcohol. With highly reactive grade, almost spontaneous reaction occurs, eliminating external heating and frequently requiring an increase in capacity of plant cooling systems to provide adequate control. Completion of reactions in shorter time permits upping total production.

Description: Difference between regular and highly reactive grades of phosphorus pentasulfide is indicated by solubilities in carbon disulfide. Regular grade enters solution to 0.222 gm/100 gm of solvent. Highly reactive grade reaches 1.6 gm/100 gm of solvent. Both grades were tested at 17°C.

Both grades have essentially the same physical characteristics. Greenish yellow granular powders, their typical analysis is 27.9% phosphorus, 72.0% sulfur. Complete melt occurs at 285°C.

(Highly reactive phosphorus pentasulfide is produced by Inorganic Chemicals Div., Monsanto Chemical Co., Dept. CP, 710 N. 12th Blvd., St. Louis 1, Mo. . . . or for more information check 2071 on the convenient Reader Service slip which is located opposite last page.)

Stop caking in caustic solutions with vat dyeing preparation . . .

improved sodium hydrosulfite preparation is dustless, has uniform particle size

Uses: Developed primarily for vat dyeing, material is equally effective in stripping colors from cotton, rayon, and other cellulosic fabrics.

Features: Preparation provides ease of handling in dry chemical feeding devices and freedom from caking in caustic solutions. Because it dissolves almost instantly, pipe and gutter systems do not become clogged.

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(Vatrolite, improved sodium hydrosulfite preparation, is product of Royce Chemical Co., Dept. CP, Carlton Hill, N.J. . . . or for more information check 2072 on form opposite last page.)

Hard paraffin wax melts at 215°F . . .

polish, coating uses seen

Uses: In making polishes, coatings, and candles.

Features: Excellent hardness, water resistance, and high-shining quality when buffed, make this wax suitable in emulsion, solvent, and paste-type polishes. High melting point of 215°F should be of advantage to makers of paper cups and wrappings for hot foods, and in other paper coatings. It will harden and extend candles and candle coatings.

Description: Paraffin is made by Fischer-Tropsch process from coal. Producer is the South African Coal Oil and Gas Co. Price, availability, and purity are stabilized.

(Paraflint wax is distributed by Moore & Munger, Dept. CP, 33 Rector St., New York 6, N. Y. . . . or for more information check 2073 on form opposite last page.)

Offers deodorant for aerosol fillers . . .

kills organic, inorganic odors

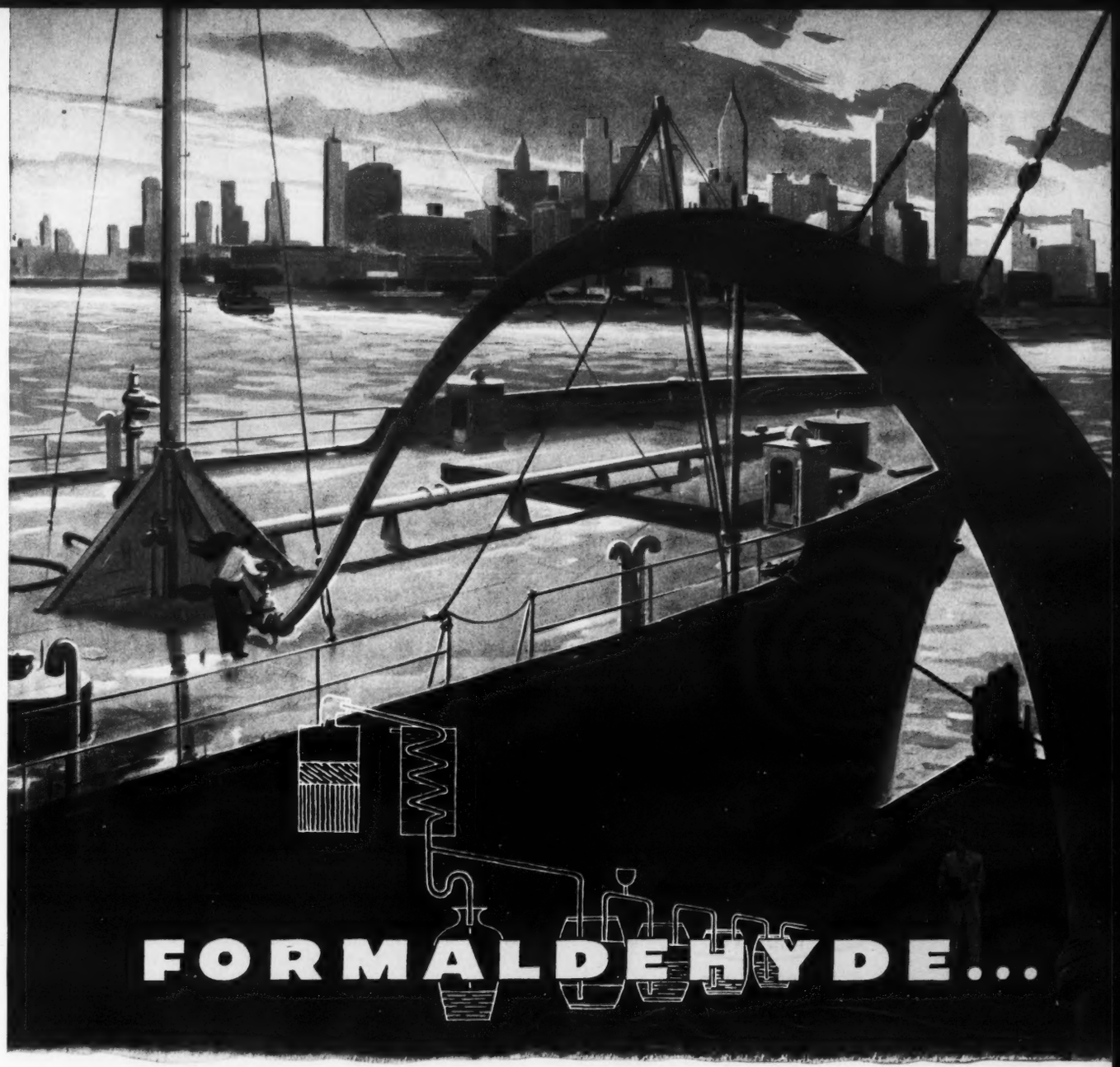
Uses: As a deodorant for aerosol dispensing.

Features: Agent destroys most organic and inorganic odors.

Description: Called Meelium, product is now offered to the general trade. Supplied as a concentrate, it is diluted with deodorized kerosene for use.

(Meelium is distributed by Prentiss Drug & Chemical Co., Inc., Dept. CP, 110-116 William St., New York, N. Y. . . . or for more information check 2074 on form opposite last page.)

For more information on product at right, specify 2075 . . . see information request blank opposite last page.



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The first production of Formaldehyde in 1889 by Merchlin and Lösekann was measured in a handful of kilograms and carefully doled out to laboratories and manufacturers. Today, Celanese alone regularly delivers millions of gallons of this workhorse chemical by tanker, barge, highway and rail.

And today's Formaldehyde . . . the Formaldehyde developed by progressive Celanese research . . . is a specialized chemical produced in a variety of concentrations to meet specific process requirements, to help speed and improve the manufacture of thousands of products. Celanese, one of the world's largest producers of Formaldehyde, now supplies: Formalin (37%), Paraformaldehyde (flake-91%), Formcel Solution (Formaldehyde in specified alcohols) and Trioxane (anhydrous trimer).

Harnessing this workhorse chemical into these much needed specialized types, as well as distributing them in continuous commercial quantities, are part of a Celanese program to render better service to industry through more productive basic materials.

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Bad odors are objectionable and—in many ways—costly. We have specialized in the chemical control of offensive industrial odors for many years. If confronted with any type of odor problem, consult with our experts for an economical solution. Write us in detail.

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PREPARATION OF SUGAR ESTERS

Conversion of Fat to Methyl Ester

Conversion of Methyl Ester to Sugar Ester

Sugar and fat react to make —

edible surface-actives that have good properties and low cost

Uses: Nonionic surface-active agents made from sucrose and fat will make ideal emulsifiers in pharmaceuticals, cosmetics, and detergents, for toothpaste, soaps, shaving preparations, and "stingless" shampoos.

The petroleum industry can put them to use in secondary oil recovery, and agricultural chemists will use them as emulsifiers for insecticides and as surface-actives for addition to feed to improve its digestibility. Many uses are also seen in the food industry. Solids, they can be used in free-flowing powders, and in blocks and cakes.

Features: Probably the biggest feature is the ready availability of the raw materials (sugar and fat or oil), and their low prices. The reaction products are low-cost, nonionic surface-active agents, which are not only non-toxic but even nutritional. When in full production, they will be the least expensive nonionics on the market.

They are odorless, tasteless, and non-irritating. Shampoos made from them won't sting the eyes. The sugar esters are among the very few nonionics that are solids, and this should be of advantage for certain uses.

Description: Sucrose monoesters consists of a sucrose molecule and a fatty acid group, predominantly on the 6-position of the glucose radical. Other esters consist of sucrose and two or more fatty acid groups. They are made by first reacting glycerides of fatty acids with methanol which forms methyl esters of these acids. These are reacted with an excess of sucrose. If less sucrose is used, diesters are formed. With about 0.1 mole of an alkaline catalyst such as potassium carbonate, about 90% conversion is made.

The reactions are shown in the above chemical equations.

The sucrose monoesters are soluble not only in water, but also in alcohols, ketones, aromatics, and chlorinated solvents. Sucrose diesters are soluble in these organics and also less polar solvents such as vegetable oils and paraffinic hydrocarbons. Thus they can be used as intermediates to make other chemical compounds, or polymerized.

The manufacturer, Berkeley Chemical Corp., Berkeley Heights, N.J., has licensed the process from the Sugar Research Foundation, New York City. Initial process development work was conducted by Foster D. Snell, Inc., for the Foundation.

Tests indicate that the sugar esters are excellent emulsifying agents and are low to moderate in their foaming action. They can be built into efficient detergents. The Draves test shows them to be fair wetting agents.

(Sucrose esters are available in pilot plant quantities from the sales agent, Millmaster Chemical Corp., Dept. CP, 295 Madison Ave., New York 17, N.Y. . . . or for more information check 2078 on form opposite last page.)

Offers seven organic intermediates

Seven organic intermediates are offered by manufacturer. Each undergoes numerous reactions, and has these properties attributed to it:

o-Aminophenol melts at 171-173°C. The colorless crystalline solid has the formula C_6H_7NO.

Nicotinic acid, $C_6H_5NO_2$, is a white crystalline solid melting at 234-236°C.

o-Nitrophenol is a bright yellow crystalline solid melting at 45-47°C. Emperical formula is C_6H_5NO.

4-Nitropyridine N-oxide, $C_6H_4N_2O_3$, melts at 158-159°C. It is a yellow crystalline solid.

Pyridine N-oxide is a colorless crystalline solid melting at 64°C. Formula is C_5H_5NO.

Quinoline N-oxide (dihydrate), $C_9H_{11}NO_3$, melts at 58-60°C, is a yellow crystalline solid.

8-Quinolinol melts at 73-74°C. White needles in form, formula is C_9H_7NO.

Triphenylphosphine, $C_{18}H_{15}P$, melts at 80-82°C. The compound appears as pale yellow plates.

(Organic intermediates are products of Beacon Chemical Industries, Inc., Dept. CP, 33-51 Richdale Ave., Cambridge 40, Mass. . . . or for more information check 2079 on form opposite last page.)

Controls scale and corrosion, kills algae in water . . .

for treating water used for cooling towers and evaporative condensers

Micromet Plates are added to cooling water systems every few months to inhibit scale formation and control corrosion. About ½ lb of this self-feeding phosphate product per ton of refrigeration capacity is placed in a plastic-coated open-mesh bag, and will last about six months.

Scale remover, an inhibited acid in powder form, safely removes scale without hurting metal surfaces. It contains a wetting agent to increase its efficiency on oily surfaces, and also an indicator is that causes water to change color when remover is mostly neutralized. The remover dissolves about ½ lb of $CaCO_3$ scale per pound and may require several doses.

Algaecide comes in pellet form, is placed in feed bag and hung in recirculating water. Two pellets in 50 gal water is equivalent to 25 ppm chlorine, and gives a good kill without any danger to cooling water system. Repeat additions to prevent build-up of algae.

(Water treating chemicals are products of Micromet Div., Calgon, Inc., Dept. CP, PO Box 1346, Pittsburgh 30, Pa. Check 2080 opp. last page.)

WHAT DO YOU HAVE IN MIND FOR RED OIL?
MATERIAL COSTS SOARING?
Swift's exclusive process makes low cost Red Oils available to do many high quality jobs
If the red oil application you have in mind is clouded by the high cost of a superior grade, Swift may have the answer for you. The low temperature Solexol manufacturing process, used exclusively by Swift, provides positive controlled removal of impurities and selective decolorization of red oils.
For the red oil user, this process helps insure three outstanding product advantages often associated with only higher priced grades:
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COLOR STABILITY of Swift's Red Oils provide a degree of uniformity to help match the most rigid color, and odor, requirements.
VARIETY. Selective extraction helps provide a variety of Swift's Red Oil products ranging from the "work horse" grades to higher quality "application pure" red oils and each is produced fresh to stay fresh and stay uniform to specification from batch to batch.
Yes, SOLEXOL is the reason why Swift & Company is able to offer economy priced, Red Oil #805 and #810 . . . products which will meet many of the color and stability requirements laid down for higher priced red oils. A trial order may result in savings for you. Return the coupon and remember . . .
ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS
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Now there are four big reasons why Aniline users should make National their first source of supply.

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We will be pleased to furnish samples, specifications, price and delivery quotations.

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High-purity reagents furnished complete with analyses

Lead sulfide for purity-sensitive work is available for the most exacting analytical needs. Typical analysis: 0.3% nitric acid insolubles, 0.01% Cl, 0.01% Fe, 0.01% Cu.

Sodium formate is known to analytical chemists as an important precipitant for noble metals. It is available in high-purity grade with individual analysis. Typical analysis: 0.005% is insoluble matter, 0.001% Cl, 0.003% SO_4, 0.005% Ca, 0.005% Pb, and 0.005% Fe.

(Lead sulfide and sodium formate are products of Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. . . . or for more information check 2082 on form opposite last page.)

Colloidal silica progress report

Four-page bulletin gives latest information on Cab-O-Sil colloidal silica for paint industry. Bul CPai-2 (rev.) is issued by White Pigments Div., Godfrey L. Cabot, Inc., Dept. CP, 77 Franklin St., Boston 10, Mass. When inquiring check 2083 on form opposite last page.

Properties, handling of bromine

Bromine, its properties and methods of handling are thoroughly covered in this beautifully done 32-page booklet.

"Bromine" is issued by The Dow Chemical Co., 1000 Main St., Midland, Mich. Check 2084 opposite last page.

For more information on product at left, specify 2085 . . . see information request blank opposite last page.

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Ludlow Succeeds Keane as Director of U.S.I. Sales

Alden R. Ludlow, Jr. has been named Director of Sales for U.S.I., succeeding Lee A. Keane who has just retired. Mr. Ludlow has been Manager of Alcohol Sales for the past ten years.

He will now have full charge of the nationwide U.S.I. sales organization, responsible for marketing all of the company's product lines.

Alcohol Reduces Friction In Aluminum Grinding, Says Russian Report

A 44% decrease in friction when grinding aluminum with the aid of ethyl alcohol, compared with results obtained in air, is reported by a Russian experimenter at the Siberian Physico-Technical Institute. At the same time it was noted that abraded mass decreases 34% and specific energy 14% compared with results obtained in air.

The investigation was conducted to learn more about how liquids actually aid in the cutting and grinding of metals. Some Russian research men have claimed that these liquids loosen the metal molecules at the working surface. Others have deduced that they make the metal more brittle.

This investigator has concluded, in the case of grinding aluminum with the aid of ethyl alcohol, that the liquid forms a buffer layer which decreases the pressure of the load and so decreases the force of friction.

Have You a New Product To Tell the World About?

Make it routine to send your publicity releases on new products and developments to the Editor of U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries." The issue you are reading right now will be printed in over 250,000 copies of the leading publications serving the chemical and related fields. The Technical Developments column alone will probably produce over 600 inquiries, judging from the past average. You incur no charges or obligations by sending us your new product releases. The material will be judged and used solely on the basis of newsworthiness and space limitations. And of course we cannot guarantee that your item will definitely appear because of these considerations.

Address the Editor, *U.S.I. Chemical News*, U.S. Industrial Chemicals Co., Division of National Distillers Products Corporation, 99 Park Ave., New York 16, N. Y.

Medium-Density Polyethylene Is Now Available from U.S.I.

Expansion to 100 Million Pounds per Year Will Place Plant Among World's Largest; Output to Include Conventional and Higher Density Resins

New production techniques are yielding higher density polyethylene resins at the Tuscola, Illinois plant of U.S.I.'s subsidiary, National Petro-Chemicals Corporation. These materials are designed for use where the conventional (low-density) resins do not quite meet requirements for certain applications. They have greater stiffness and tensile strength than the conventional grades, and a higher softening point. Low temperature brittleness and vapor permeability characteristics also improve with increasing density. On the other hand, as density gets higher, film brittleness tends to increase while tear and impact strengths tend to decrease.

The MCA Technical Data Book for Plastics identifies polyethylene resins according to densities in the following manner:

LOW DENSITY	— 0.912 to 0.925
MEDIUM DENSITY	— 0.926 to 0.941
HIGH DENSITY	— 0.942 to 0.965

Expansion Doubles Plant Size

Total resin capacity of the polyethylene unit will be 100 million pounds per year when present expansion is completed. This unit had a design capacity of 26 million pounds per year when it came onstream in February of 1955 but is currently operating at twice that output. The ethylene plant and the extraction, fractionation and power plants at the integrated Tuscola petrochemical facilities are also being enlarged to supply the polyethylene plant.

MORE

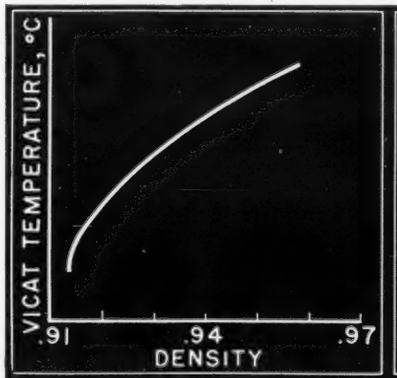
New Volume on Metallurgy Of Titanium Just Published

A 466-page reference book on "Titanium" has just been published as Volume 4 in a series on the "Metallurgy of Rarer Metals" by the British writing team of McQuillan and McQuillan. Comprehensive and highly readable, the volume combines both academic and industrial findings on titanium, covering its history and occurrence, recovery from ores, preparation, purification, properties and reactions.

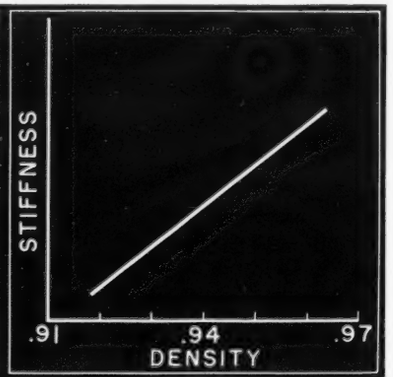
The larger part of the book is concerned with the properties of titanium and its alloys. One long chapter deals with fabrication and joining. Other sections cover physical properties, mechanical properties, heat-treating and mechanical properties of titanium-rich alloys, deformation mechanisms and textures, transformations in titanium and its alloys.

A chapter on the constitution of titanium alloys describes the problems which arise in studying these systems and goes into the determination of phase boundaries. Binary and ternary systems are discussed. A separate chapter is devoted to titanium metallography.

The important subject of titanium's reactions with gases is covered fully, with particular reference to oxygen, nitrogen and hydrogen. The behavior of titanium in aqueous solutions and in the presence of common corrosive agents is also included.



Graph illustrates how heat distortion (VICAT) temperature varies as density of polyethylene increases, molecular weight and molecular weight distribution remaining constant.



Graph illustrates how stiffness varies as density of polyethylene increases, molecular weight and molecular weight distribution remaining constant.

U.S.I. CHEMICAL NEWS

CONTINUED *Expansion*

High Pressure Process Modified

By modifying high pressure techniques now employed at Tuscola for making conventional, low-density resins, the plant is also able to manufacture medium and high density materials in the same equipment. U.S.I. will concentrate, for the present, on producing medium-density polyethylenes by these modified techniques.

U.S.I. has been marketing conventional, low-density polyethylenes (0.92) under the trade name PETROTHENE® since February of 1955. In use, the PETROTHENES have shown an inherent superiority in certain properties such as stress crack resistance, processibility and uniformity. Field tests on the new medium-density resins, closely akin to the conventional grades, have indicated similar superiority. However, as density is increased, there is the possibility that these proven properties could vary. A great deal of work must be done to develop the best of all possible high-density resins, and so U.S.I. plans to move slowly on the production of these materials. The goal: to improve other properties without sacrificing superiority in those properties already proved.

Resins Can be Tailor-Made

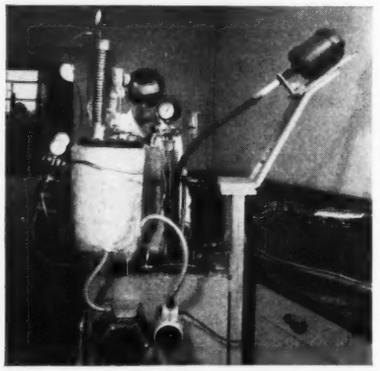
Flexibility of the production techniques now being employed at the Tuscola plant adds a new dimension to polyethylene's range of properties. This plant has been supplying plastics processors with polyethylene grades especially suited to particular processing conditions and end uses. Now with the ability to vary density, the plant can provide the same property variations as before—at new density levels. As a result, processors of polyethylene can obtain a tremendous variety of raw materials with a wide range of characteristics.

Methionine Counteracts Toxin in Plant Disease

The poisonous action of a naturally occurring antimetabolite of methionine which causes wildfire disease in tobacco plants can be overcome by methionine, according to a recently published report.

Some Grignard Reagents Can Now be Prepared by An Easy Sodium Route

An economical route has now been opened to the preparation of certain Grignard reagents difficult to obtain by direct reaction from chlorohydrocarbons. Recent studies at the U.S.I. Research Laboratories in Cincinnati have demonstrated that organomagnesium compounds may be prepared in hydrocarbon solvents from organosodium compounds and anhydrous magnesium chloride. The use of ethers may be avoided completely if desired. Organolithium compounds may be similarly prepared from organosodium compounds and anhydrous lithium chloride.



Sodium dispersions for preparation of organosodium compounds can be prepared in this package pilot plant unit, which is available on loan from U.S.I. Research Division.

These developments will be discussed in detail by Dr. John Nobis of the U.S.I. Research Division in a paper to be presented before the ACS Symposium on Metal-Organic Compounds this April. The paper, entitled "Use of Organosodium Compounds for Preparation of Other Carbon-Metal Bonds" will also describe reactions with the halides of boron, aluminum, silicon, titanium, tin and phosphorus, or in some cases, their alkoxides.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

New x-ray microscope just developed promises to reveal hidden facts concerning corrosion in metals, effect of contaminants in metals, soundness of electroplated coatings, etc. Also probes internal structure of foods, chemicals. **No. 1200**

Polyethylene Buchner funnel of 2-piece construction can now be obtained, claimed sturdy and easily cleaned. Takes 70 mm. filter paper. Perforated plate diameter 71 mm. **No. 1201**

Heptane and hexane in spectrophotometrically-pure grades are now available commercially. Each bottle is supplied with the absorbance curve for that particular lot, thus guaranteeing that impurities are negligible. **No. 1202**

New battery with practically unlimited shelf life is said to withstand temperatures from —70 to 170°F. Designed for low-current use, it weighs less than an ounce, is of completely dry construction, is rated at 95 volts. **No. 1203**

Spent fuel elements from AEC Materials Testing Reactor now available in limited quantity for rental to licensees as source of gamma radiation. Priority given to requests for elements for research and development activities. **No. 1204**

A micro-image data storage and retrieval device recently developed gives rapid access to any of 10,000 frames recorded in miniature on a 10 in. sq. sheet of microfilm. It automatically and continuously searches the film and photographs a frame every 2 seconds. **No. 1205**

Titanium in the form of a 50% cationic colloidal dispersion is now offered to the textile industry as a duller for synthetic fabrics and fibers. Said to give even exhaustion, good light reflectance and soft hand. **No. 1206**

Fluid turbidity can now be continuously monitored with a new dual beam unit, manufacturer claims. Instrument compares light scattered by suspended particles with light transmitted by the fluid. Usable on streams up to 3" diameter. **No. 1207**

N-Acetyl DL-Homocysteine Thiolactone is now commercially available for use in medical research, food technology, rubber stabilization, textile processing. Reacts with amino groups of amino acids, peptides or proteins to form new peptide bonds and a free sulfhydride group. **No. 1208**

Hot plate — magnetic stirrer combination is now offered to speed mixing and dissolving in the lab. Motor is effectively insulated from hot plate, it is claimed, and copper-jacketed heating elements eliminate magnetic interference and corrosion. **No. 1209**

PRODUCTS OF U.S.I.

POLYETHYLENE RESINS:

PETROTHENE® 100 Series—high quality resins for uses demanding outstanding properties.

PETROTHENE 200 Series—general purpose resins for extrusion, injection, compression molding and paper coating.

PETROTHENE 300 Series—resins for wire covering and electrical insulation applications.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

Inorganic Chemicals: Ammonia, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sulfuric Acid.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetarylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D_3 and K_3 products, Antioxidant (BHT) Products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates

U.S.I. INDUSTRIAL CHEMICALS CO.
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Wide variety of high-purity rare earth oxides offered

Uses: Available for metallurgical research in atomic energy, refractory ceramics, electronics, catalysis, and in analytical research.

Features: In addition to rare earth oxides, a number of rare earth salts and several metals are available.

Description: Various grades and chemical forms of rare earth oxides and compounds, imported from England, are available. Ranging from spectrographically-certified highest purity (99+%) down to 80% grades are the oxides of: Yttrium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and luterium. Salts can be prepared on order.

(Rare earth compounds are available from Jarrell-Ash Co., Dept. CP, 26 Farwell St., Newtonville 60, Mass. Check 2086 opposite last page.)

Gives improved mar resistance, flexibility, impact strength to silicone enamels . . .

excellent gloss retention at 440°F

Uses: For making heat resistant enamels.

Features: Silicone resin imparts improved mar resistance, flexibility, impact resistance, and adhesion to finishes, compared with conventional silicone types. It is particularly suited to white or light colored enamels. Test panels show outstanding gloss retention when oven aged for more than 3000 hr @ 440°F, and also show good resistance to oils, fats, greases, chemicals, and weathering.

Description: Supplied at 64-66% solids content in 70:30 xylol/butanol solvent, the resin will cure in 30-60 min @ 350-400°F when properly catalyzed. The enamels will give service between 400-500°F, and compare favorably with alkyd-amino type finishes. Resin is compatible with most low and medium viscosity urea- and melamine-formaldehyde resins and has limited compatibility with certain alkyds. Viscosity of the resin is 200-350 cp @ 25°C, color is light straw, flash point is above 80°F.

(SR-120 silicone resin is a product of Silicone Products Dept., General Electric Co., Dept. CP, Waterford, N. Y. Check 2087 opposite last page.)

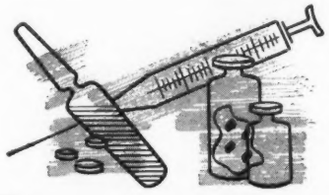
For more information on product at left, specify 2088 . . . see information request blank opposite last page.

Which New CO_2 Application Will Help You Most?

"CO_2 applications are unlimited"... a broad statement, but literally true. New ways in which this most versatile of all gases is improving products, cutting costs and saving time and labor are being developed almost daily. Some of the applications discussed here will be of direct, primary interest to you. Other uses, while perhaps not in your immediate specialty, may well be *adaptable* to your field. Check the box by each application on which you'd like detailed, technical data and mail this page to:

The Liquid Carbonic Corporation • CO_2 Division
3100 South Kedzie Avenue • Chicago 23

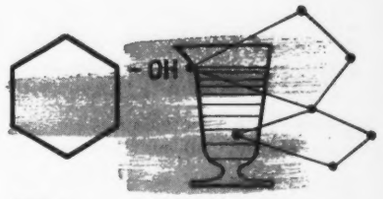
Your inquiry will receive prompt, professional attention from the chemical applications staff of the world's largest producer of CO_2.



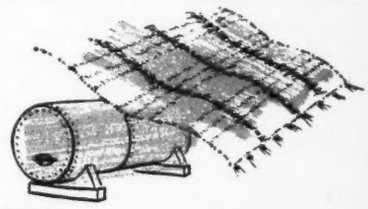
☐ ▶ **Economical, Efficient "Freeze-Drying"**—Freeze-drying is used to dehydrate heat sensitive substances at low temperatures. In the processing of blood plasma and the manufacture of penicillin, streptomycin and other pharmaceuticals, dry ice or liquid CO_2 is used to freeze the item being dried. Also, during the drying stage, dry ice is used to condense the moisture as it is sublimed under vacuum. Capable of quickly attaining and maintaining the extreme low temperatures required, CO_2 has the added advantage of requiring only a small capital outlay.

☐ ▶ **Precipitation of Carbonates**—Carbon dioxide in its gaseous form is used to precipitate carbonates from water solutions. Ammonium bicarbonate and lead carbonate are examples. Bakeries and plastics manufacturers are among the many users of ammonium bicarbonate.

☐ ▶ **Simplifies Pulverizing of Materials With Low Melting Point**—Many substances tend to melt or smear because of the heat generated in a milling process. DDT and vegetable fat flakes which are waxy and Teflon resin which is very tough and elastic are examples. In the low temperature pulverizing process the ingredient is mixed with crushed dry ice or low pressure carbon dioxide liquid is injected directly into the ingredient. These methods effectively inhibit the melting or smearing, prevents plugging and reduces horse power requirements. Gaseous carbon dioxide is also used to form an atmospheric "blanket" to effectively prevent fire during the grinding of flammable materials. An example of this application is the grinding of phosphorus pentasulphide and flammable resin materials.



☐ ▶ **Fireproof "Blanket" For Stored Phenol**—Phenol is a toxic, corrosive, flammable compound and is stored in an inert atmosphere under slight pressure to reduce vaporization, prevent oxidation and at the same time provide a non-flammable atmosphere. Carbon dioxide is also used as a pressure medium in transferring liquid phenol.



☐ ▶ **Effective Inerting Agent**—There are many times when an inert atmosphere is needed to prevent fire or explosion. Before welding a tank that has been used for the storage of flammable liquid, CO_2 is used to inert the atmosphere in the tank so that welding can be done with no danger of explosion. CO_2, acting as an effective atmospheric "blanket," also prevents oxidation and "skinning" of paints and oils.

SEND IN THIS PAGE FOR COMPLETE INFORMATION

Check off the applications which interest you, fill in the mailing information below, and mail this page to The Liquid Carbonic Corporation for prompt information. You'll also receive a free copy of our Booklet "Applications Unlimited," which covers dozens of other important uses for CO_2.

World's Largest Producer of
THE LIQUID CARBONIC CORPORATION
3100 South Kedzie Avenue Chicago 23, Illinois

THE LIQUID CARBONIC CORPORATION
3100 South Kedzie Avenue • Chicago 23, Illinois

NAME_____
TITLE_____ COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

When inquiring check 2089 opposite last page

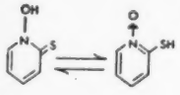
Broad and potent bactericides and fungicides offered for paint, paper . . .

range of physical properties are available

Uses: As bactericides and fungicides for non-food applications such as paint, wood and timber, pulp and paper, leather, textiles and plastics, adhesives and industrial cleaners.

Features: Compounds have broad and potent antibacterial and antifungal properties.

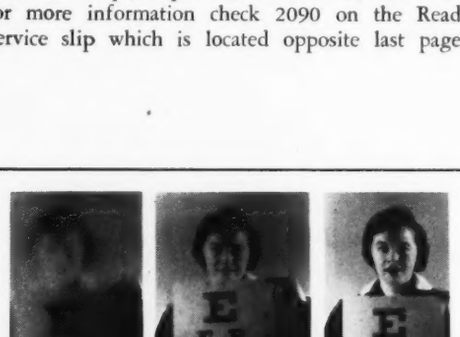
Description: Derivatives of pyridinethione have been made available. This gives a range of physical properties for evaluation. The structural representations of the tautomeric forms of the parent compound are shown here. Three salts and the disulfide are available. Typical physical properties are given in the table.



Compound	MP (°C)	Solubilities (%) Water	Ethanol	Benzene	Oils
Disulfide	192-194	1.0	I	I	—
Sodium salt	252-254	VS	7	I	I
Zinc salt	231-233	I	I	I	I
Ferric salt	191	I	I	I	I

I=Insoluble VS=Very Soluble

(Pyridinethione and derivatives are products of Industrial Chemicals Dept., Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. . . . or for more information check 2090 on the Reader Service slip which is located opposite last page.)



Film-grade polyethylene resins . . .

. . . offer greatly improved clarity, specifically for packaging applications. To show the amount of relative clarity, an eye-chart was photographed at exactly same distance behind film made from conventional resin (left), from an intermediate resin (middle), and from new-formulation resin (right).

(Film-grade polyethylene resins are manufactured by Bakelite Co., a Division of Union Carbide and Carbon Corp., Dept. CP, 260 Madison Ave., New York 16, N. Y. . . . or for more information check 2091 on form opposite last page.)

BRIEFS FOR BUYERS

about Caustic Soda • Caustic Potash

Sulfur Chlorides and Oxychlorides

Apparently the Caustic Soda Buyer's Guide fills a need

This pocket-size compendium of useful facts on caustic soda has proved so popular and useful we've ordered a second printing.

Besides much basic information on forms and grades, containers and shipping methods, the *"Guide"* treats of such diverse subjects as these:

- Comparative economics of 50% and 73% liquid caustic soda. An unbiased report on the advantages of both strengths with both a table and nomograph to help you figure quickly if there are any possible savings for you with the 73% liquid.
- The amount of liquid caustic of a given strength you must have to develop various process concentrations. Another nomograph helps you figure your needs in minutes.
- Some points to ponder before you choose a supplier of heavy chemicals.

Get a copy of this second edition for your use. Check the coupon on the next page.

New data sheet on Caustic Potash

We have just completed a data sheet on NIALK® Caustic Potash—one of the newest members of the Hooker roster of chemicals.

We believe you'll find that the new specifications measure up in every way to the high NIALK standards of the past.

If you use caustic potash and purchase other Hooker chemicals such as caustic soda, it might pay you to look into the possible savings of a consolidated source of supply.

You can get NIALK Caustic Potash in standard and low-chloride grades, in 45% to 52% liquid solutions; and in the following solid forms, as 90% and as 85% (low chloride) material: solid, flake, granulated, broken, crushed, powdered, and walnut.

The liquid forms are shipped in tank cars of 4,000 to 10,000-gallon capacity. Solid forms are shipped in steel drums.

To keep your file up-to-date, send for the new data sheet. Just check and mail the coupon.

K_2CO_3 as you like it

No matter how you use carbonate of potash in your processing, you're sure of the *right* form when you specify NIALK Carbonate of Potash.

That's because we make it in these *five* forms:

1. Hydrate regular (granular) 83.5% to 84.0%
2. Calcined regular (granular) 99.2% to 99.6%
3. Calcined powder 99.2% to 99.6%
4. Powdered ..... 91.0% to 94.0%
5. Liquid ..... 48% to 52%

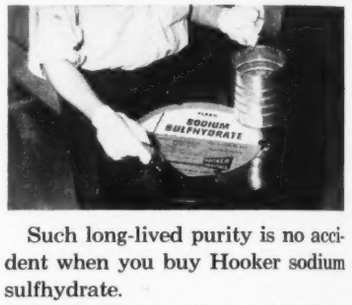
For details on the form that meets your needs best, use the coupon to request technical data.

How long can you store Sodium Sulfhydrate?

A while ago a customer of ours came across some Hooker sodium sulfhydrate which he had stored accidentally for over four years.

It looked OK, so he used it.

Results? "Excellent," says he. No apparent iron contamination in four years!

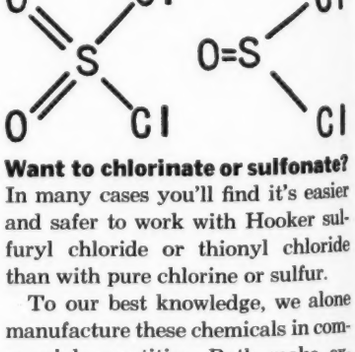


Such long-lived purity is no accident when you buy Hooker sodium sulfhydrate.

We package sodium sulfhydrate in brand-new steel drums with a 1/64-inch lining of lacquer to prevent iron pick-up. We lacquer the drum lid, and secure it with six sturdy lugs so it stays airtight until you break the seal.

Extra caution is used before the sodium sulfhydrate goes into the drum, too. We control raw materials rigidly by using only our own caustic soda and hydrogen sulfide.

That's why you always get a product that dissolves swiftly into pure, sediment-free solutions when you specify Hooker sodium sulfhydrate.



Want to chlorinate or sulfonate?

In many cases you'll find it's easier and safer to work with Hooker sulfuryl chloride or thionyl chloride than with pure chlorine or sulfur.

To our best knowledge, we alone manufacture these chemicals in commercial quantities. Both make ex-

Carbonate of Potash • Sodium Sulfhydrate
Trichlorethylene • Chlorobenzenes

cellent chlorinating agents. Either may be used to introduce sulfur or oxygen and sulfur.

Hooker sulfuryl chloride is 99+% pure. You can get Hooker thionyl chloride in two grades—the technical grade is 93% min. pure, the refined grade 97.5% min.

Two simpler chlorinating agents. You can also purchase sulfur monochloride and sulfur dichloride from us. The monochloride (technical grade) has a chlorine content of 52 to 52.5%. The dichloride is 66% chlorine.

You can get complete technical data on any of these compounds by checking the coupon.

Nialk® Trichlorethylene—extraction, technical, and X-1 grades

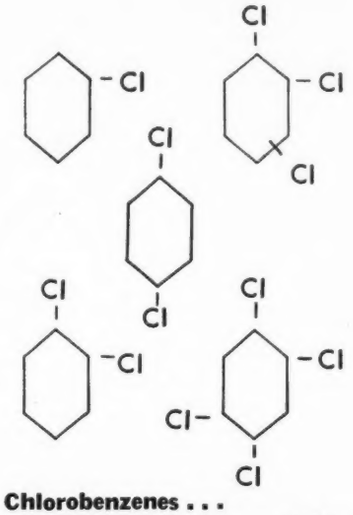
You can now purchase trichlorethylene from Hooker in several grades under the NIALK brand name.

Extraction Grade has no HCl acidity. Its alkalinity as NaOH is .006 to .008% maximum. It boils at 86.6 to 87.4° C at 760mm. Used for extracting fats from animal matter, oil from raw wool, cottonseed, flaxseed; has pharmaceutical and other uses.

Technical Grade has no HCl acidity and a maximum of 0.001% alkalinity as NaOH. It boils at 86.6 to 87.8° C at 760mm. Used as a freezing-point depressant in carbon tetrachloride fire extinguisher fluids, as a solvent in various adhesive formulations, and in similar applications.

X-1, a special grade, is available for those uses requiring a product of exceptionally high quality.

Send for bulletins. Technical Data Sheet No. 787 gives a resumé of important information on all grades. For more detailed information on NIALK Trichlorethylene and its uses, send for Bulletin No. 44, a 40-page booklet covering physical and chemical properties, shipping containers, safe handling procedures, etc.



Chlorobenzenes . . . five are Hooker specialties

Whether you use chlorobenzenes as solvents or intermediates, you are sure of finding exactly the right formula at Hooker.

Currently, we are making these five chlorobenzenes as well as dozens of other chlorinated organics and inorganics:

Monochlorobenzene. Solvent and intermediate. Typically 99.5% pure monochlorobenzene as determined by cryoscopic methods.

ortho-Dichlorobenzene, Technical. Solvent, intermediate and heat transfer medium. 85% to 87% pure *ortho*. Major impurity is *para*-dichlorobenzene.

para-Dichlorobenzene. Widely used as insecticide and as sanitary deodorant; also as intermediate. 100% pure. Available in 7 mesh sizes.

Trichlorobenzene, Technical. Used as solvent, intermediate, and as heat transfer medium. Mixture of 1,2,4- and 1,2,3-trichlorobenzene with 1,2,4-predominating.

1, 2, 4, 5 - Tetrachlorobenzene. Solid, usually used as intermediate. Contains 65.7% chlorine.

For more information on any of these chemicals, you can get data sheets listing physical and chemical properties by sending us the coupon.

HOOKER ELECTROCHEMICAL COMPANY
503 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER CHEMICALS PLASTICS

For more information on chemicals mentioned here, check below:

- ☐ *Caustic Soda Buyer's Guide*
- ☐ Caustic Soda (Technical Data Sheets)
- ☐ NIALK Caustic Potash
- ☐ NIALK Carbonate of Potash (Bulletin)
- ☐ NIALK Carbonate of Potash (Technical Data Sheet)
- ☐ Sodium Sulfhydrate
- ☐ Sodium Sulfide
- ☐ Sulfuryl Chloride
- ☐ Thionyl Chloride
- ☐ Sulfur Monochloride
- ☐ Sulfur Dichloride
- ☐ Chlorinating Agents (Bulletin No. 328A)
- ☐ NIALK Trichlorethylene (Bulletin No. 44)
- ☐ NIALK Trichlorethylene (Technical Data Sheet)
- ☐ Monochlorobenzene
- ☐ *ortho*-Dichlorobenzene
- ☐ *para*-Dichlorobenzene
- ☐ Trichlorobenzene
- ☐ 1,2,4,5-Tetrachlorobenzene

Clip to your letterhead with your name and title, and mail to us. *When requesting samples, please use business letterhead to help speed delivery.*

When inquiring check 2092 opposite last page

Casein stabilizers for latex paints resist viscosity changes and spoilage

Uses: As stabilizers in latex paint formulations.

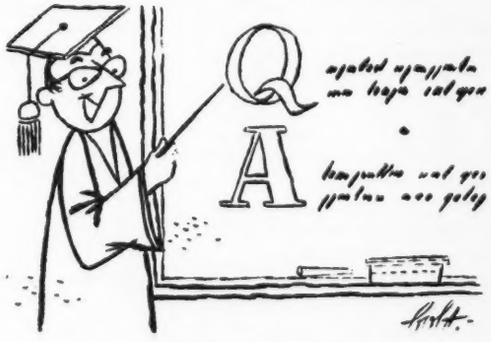
Features: Stabilizers are especially formulated to eliminate difficulties occasionally encountered with spoilage and viscosity changes. They have all the advantages of casein stabilizers, namely improved pigment dispersion, better brushability and leveling, and improved washability, freeze-thaw resistance, and mechanical stability. All are free of sodium salts.

Description: Cascoloid ST-227 is a ready-to-use casein solution of medium viscosity at 18% casein content with a pH of 8.5. Product contains preservatives to give a long storage life.

Protovac 8979 is dry. When dissolved in warm water, it gives a solution pH of 7.4. Addition of 5% NH_4OH dry basis will aid solubility and give a more stable pH. A preservative is needed if solution is to be held more than 2-3 days.

Protovac PV-424 is a dry stabilizer of fine mesh size. Low in cost, it is readily soluble and has low foaming tendencies. It will dissolve in presence of pigments in a good disperser.

(Improved casein stabilizers are products of Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . . or for more information check 2093 opposite last page.)



Question — Where can I get a quick idea of what chemical products were introduced last year?

Answer — Next month's CHEMICAL PROCESSING magazine describes over 500 new chemicals and products introduced during 1956. To make it easy to find just what you want, all items are indexed by their uses.

THE PLENTIFUL RARE EARTHS

some facts about a clubby clan of elements that are rare in name only

a report by LINDSAY

We got to thinking the other day that perhaps a lot of industry folks are passing up a diamond-studded opportunity because they believe the rare earths are unavailable in commercial tonnages. Nothing could be farther from the truth. Rare earths are *not* rare! Commercial salts of the rare earths are available, right now, for prompt shipment in quantities from a gram to a carload.

That the rare earths are so plentiful is due, in large part, to Lindsay. During the last 50 years, Lindsay has developed the extraction and separation of rare earths to a high degree.

New equipment and processes are now in operation at Lindsay's West Chicago plant and are producing greater quantities of these versatile materials in higher purities than before.

FROM 57 THROUGH 71—Some chemists call rare earths Lanthanides, Lanthanons or the Lanthanum Series. Actually they are not earths, but trivalent metals, a rather amazing family of elements . . . atomic numbers 57 through 71. They are grouped together because they are always found together, with thorium and yttrium, in ores such as monazite, and all have closely related properties. While rare earths are technically metals, Lindsay produces them in chemical salt forms—individually or in combinations.

ATOMIC NUMBER	ELEMENT
39	Yttrium
57	Lanthanum
58	Cerium
59	Praseodymium
60	Neodymium
62	Samarium
63	Europium
64	Gadolinium
65	Terbium
66	Dysprosium
67	Holmium
68	Erbium
69	Thulium
70	Ytterbium
71	Lutetium
90	Thorium

SOME USES FOR RARE EARTHS

LANTHANUM—As lanthanum oxide in a high refractive optical glass, particularly for aerial cameras and other instruments.

CERIUM—Glass polishing. Scavenger in explosives production. Radiation protection glass for atomic reactors. Opacifier for porcelain. Oxidizing catalysts in organic preparations. Ultraviolet light absorber.

MIXED RARE EARTHS—Misch metal for lighter flints and alloy uses. Motion sickness medication. Cores of arc carbon electrodes. Aluminum and magnesium alloys.

PRASEODYMIUM & NEODYMIUM—Dichroic colorants for ceramic glazes and glass. Used in better grade sun glasses. They do not lower light permeability and index of refraction when used as colorant or decolorizer. Ceramic capacitors.

The rare earths are becoming increasingly important in the production of steel and steel alloys. Small quantities added to the metal in the ladle result in a strong, fine-grained steel. Steel thus treated has great resistance to low temperature oxidation and corrosion. Stainless varieties have better hot and cold workability. Silicon and electrical grade steels have better electrical qualities.

Rare earths added to cast iron act as powerful deoxidizers and help remove sulfur from the molten metal. They are responsible for cast iron that is resistant to scaling at higher temperatures and to certain corrosive atmospheres. In malleable metals, they act as a carbide stabilizer.

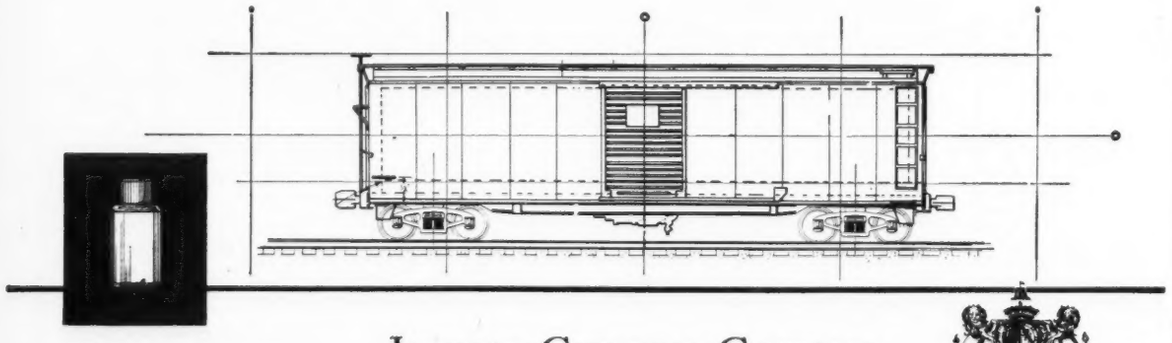
Magnesium-rare earth-zirconium alloys have excellent casting qualities and mechanical properties that make them ideal for important light-weight stressed components of aircraft engines.

Other rare earth compounds are used extensively for waterproofing, mildewproofing, weighting and dyeing of fabrics and compounding printing inks and phosphors.

LIKE AN ICEBERG—You might compare uses for the rare earths to an iceberg. What you see is only a small part of what lies undiscovered under the surface. In all probability, there is a real place for one or more of the rare earths in your operations. New uses—and profitable ones, too—are being discovered constantly. These versatile elements offer so much promise in so many different ways they merit your investigation.

To industries interested in the rare earths, we offer detailed technological data compiled over the years by our research staff. We will also furnish samples for experimentation.

And please remember . . . the rare earths are *plentiful*. Lindsay can supply you with quantities from a gram to a carload.



PLEASE ADDRESS INQUIRIES TO LINDSAY CHEMICAL COMPANY

288 ANN STREET • WEST CHICAGO, ILL.

When inquiring check 2094 opposite last page

CHEMICAL MATERIALS

Neodymium oxide with 95% purity offered as commercial grade . . .

has applications in chemical, ceramic, and many other industries

Uses: As catalysts in petroleum and petrochemical reactions; as alloying agents for metals, for preparation of quality glasses, for preparation of specialty ceramics, and many others.

Features: Offers commercial grade of purified rare earth with 95% minimum purity.

Description: Neodymium oxide, commercial grade, has the following specifications: Neodymium oxide, 95%; other rare earth oxides, 5% max; praseodymium oxide, 3% max; samarium oxide, 2% max. Price schedule on commercial grade neodymium oxide is $25.00 per lb, or 10 lb at $20.00 per lb.

(Commercial grade neodymium oxide is available from Research Chemicals Inc., Dept. CP, PO Box 431, Burbank, Calif. . . . or for more information check 2095 on form opposite last page.)

Fungicide has good solubility in water and wide range of organic solvents

Uses: Suitable as effective mildewcide and preservative in oil and water base paints.

Features: Product has good solubility in water and in a wide range of organic solvents.

Description: Development of fungicide is result of extensive research in field of mercury and mercurials. When liquid preparation is preferred, "Meta-San O" is available for oil base paints and "Meta-San W" for water base paints.

(Meta-San fungicide is product of Metalsalts Corp., Dept. CP, 200 Wagaraw Road, Hawthorne, N.J. . . . or for more information check 2096 on form opposite last page.)

Technical brochure is up-to-date on tetrapotassium pyrophosphate

Physical properties of tetrapotassium pyrophosphate (TKPP), which finds use in liquid detergents, making "cold" rubber, in latex-based paints, in water treatment, and other applications, are presented in six-sheet technical bulletin. Analysis, properties, and solution characteristics are given in graphical and tabular forms.

Bul 505-2R is issued by Westvaco Mineral Products Div., Food Machinery & Chemical Corp., Dept. CP, 161 E. 42nd St., New York 17, N.Y. Check 2097 on form opposite last page.

Offers convenient and inexpensive way to introduce tung fatty acids into surface coatings

Uses: As a convenient way of introducing tung fatty acids into a reaction.

Features: In addition to cost savings, product gives less viscosity in resultant products, less gelling problems, and better control of acid values. Lower viscosity means easier handling and the product won't cause corrosion.

Description: The methyl ester of tung oil contains about 75% methyl eleostearate. Boiling point (@ 10 mm) is 185-210°C, refractive index is 1.4985, wt/gal is 7.54 lb. It is in semi-works production.

(METO is a product of Pacific Vegetable Oil Corp., Dept. CP, 62 Townsend St., San Francisco 7, Calif. . . . or check 2098 opposite last page.)

Chemicals for white leather tannage give brighter, tougher product . . .

the white goes all the way through the leather

Uses: For the production of white-tanned leather.

Features: Materials, used in combination, give white leather that excels in plumpness, tightness, and brightness. It has a true feel, is not slick, and will stand wear and flexing.

Description: Zircotan S, sodium zirconium silicate, and Leukanol C, condensed phenolic compound, produce a tough, resilient leather in which the white goes all the way through. Although not *absolutely* lightfast in laboratory sense, leathers tanned with these chemicals are certainly so by commercial standards.

(Zircotan S and Leukanol C are products of Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . . or for more information check 2099 on form opposite last page.)

Higher concentration, less flooding with tinting black of bluish tint

Uses: As a tinting black for coatings.

Features: Dispersion of a soft, blue-tone furnace black gives pleasant bluish tint and enhances antiflooding properties.

Description: Tinting dispersion has higher concentration than that available previously.

(Tinting Black H is a product of Carbon Dispersions, Inc., Dept. CP, 27 Haynes Ave., Newark 5, N.J. . . . or check 2100 opposite last page.)

EXON 900 Series resins are tailored to your temperatures

...typical of the Pin-Pointed Properties in Exon vinyl resins

This unique fitting-the-resin-to-the-need is what makes Exon industry's most complete source of vinyl resins.

Take our friends, the calenderers. They produce vinyl in sheet form which demands resin properties quite different from those used in other forms of vinyl processing. Yet even having those properties is not enough. For calendering equipment varies widely in processing characteristics, particularly in temperatures.

Exon engineers created a basic resin to give calenderers the necessary properties to begin with. This resin was made to be fast blending to fuse in shorter time, to keep sheeting free of "fish-eyes," assure high quality, uniformity.

Then Exon engineers tailored this basic calendering resin to the temperature behavior of processing equipment . . . developed Exon 905, 915, 925 resins so that heat problems never again need hinder the production of any calender.

It's a typical example of Exon at work, pin-pointing properties to special needs.

Consider your problem. Then, for a resin pin-pointed to the ideal solution, call or write Firestone today.

Firestone EXON RESINS

For complete information and technical service, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS CO., DEPT. 78-E, POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

CHEMICAL PROGRESS WEEK-APRIL 8-12

INDUSTRY'S MOST COMPLETE LINE OF VINYLS ENGINEERED TO YOUR SPECIFIC NEEDS

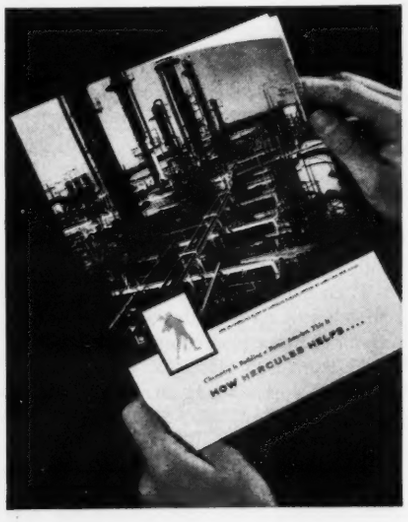
When inquiring check 2101 opposite last page

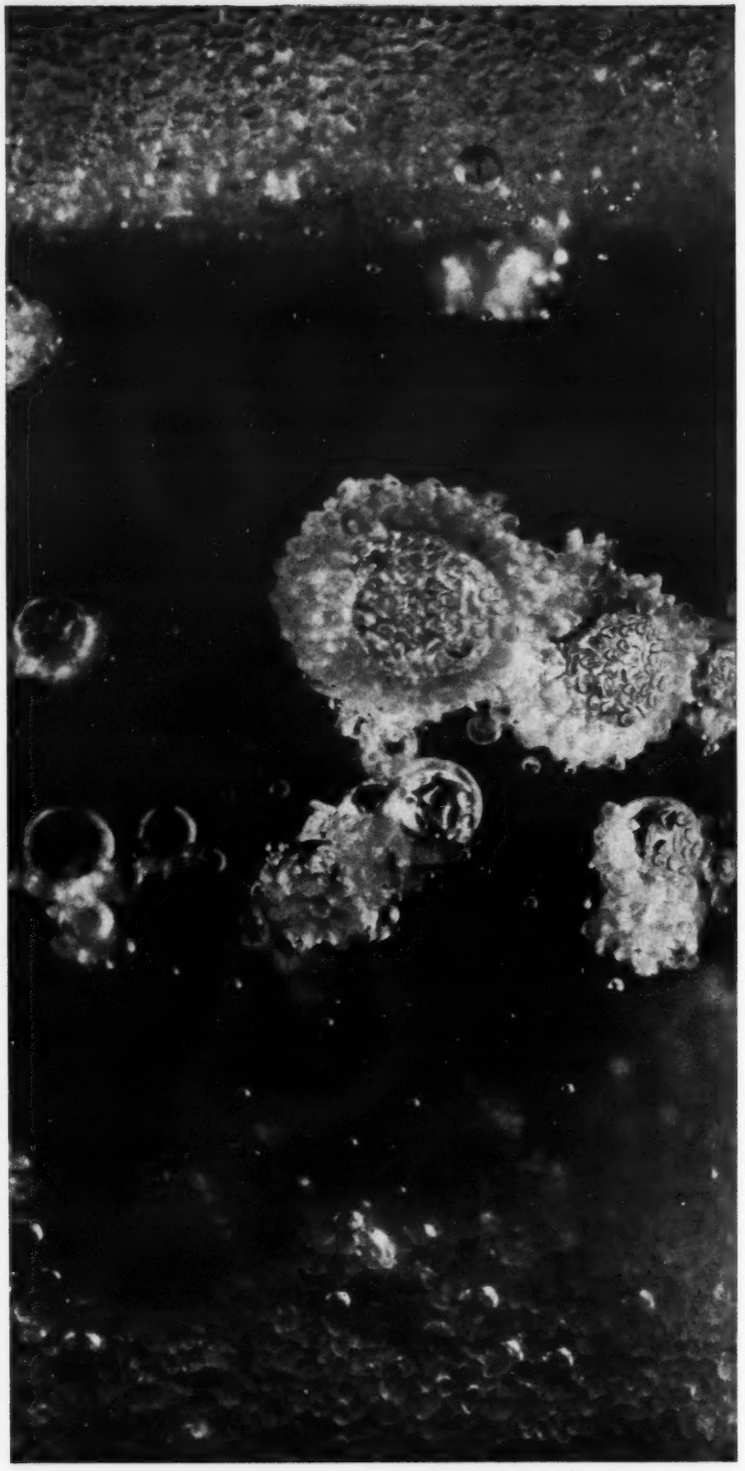
HOW HERCULES HELPS...

RECOVER NONMETALLIC MINERALS—By adsorption to siliceous surfaces, such as mica, feldspar, glass, Hercules Rosin Amine D* and its derivatives form a molecular film that changes the surface properties of the substance. One result in aqueous solution is flotation of the silica in ore benefication. This property is shown in this photograph of sand flotation. Perhaps the rosin amines hold the key to the solution of one of your problems. (*Photo by Bernard Hoffman.*)

**Hercules Trademark*

'HOW HERCULES HELPS' is the title of this new 36-page picture booklet showing end uses of Hercules products and containing a brief history of the company. For your copy just drop us a line or ask your local Hercules representative.





HERCULES

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES POWDER COMPANY
INCORPORATED
940 Market St., Wilmington 99, Del.

Q57-2

SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS, ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS, EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS

When inquiring check 2102 opposite last page

Combine reactivity of epoxy and versatile side chain in terpene oxide duo . . .

terpene oxides undergo unusual reactions

Uses: Compounds are suggested for use as intermediates in manufacture of perfumes, protective coatings, lubricant additives, adhesives, and plasticizers; as reactants in organic synthesis, and as solvents.

Features: Dipentene monoxide combines reactivity of epoxy group with that of an olefinic double bond in a cyclic terpene molecule. Alpha-pinene oxide combines reactivity of epoxy group with that of bicyclic system of alpha-pinene.

Description: Dipentene monoxide contains about 9% oxirane oxygen and has a purity of 85-88%. Alpha-pinene oxide contains about 9.4% oxirane oxygen and has a purity of about 90%. Both compounds are available in laboratory quantities.

(Dipentene monoxide and alpha-pinene oxide are products of Becco Chemical Div., Food Machinery and Chemical Corp., Dept. CP, Station B, Buffalo 7, N.Y. . . . or for more information reader may simply check 2103 on form which is located opposite last page.)

High in activity, low in cost synergist has low toxicity . . .

in combination with pyrethrins, it gives high kill without use of toxic insecticides

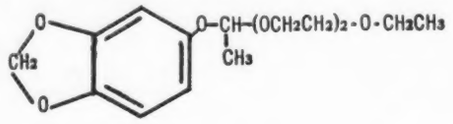
Uses: As synergist for pyrethrins and related insecticides.

Features: Costs less to use than other available synergists in all formulations for equal knockdown and kill. In combination with pyrethrins, it

Discoverer of this synergist is Dr. Morton Beroza of USDA's Beltsville, Maryland, laboratories

gives high kill without use of toxic insecticides. It has low acute oral toxicity.

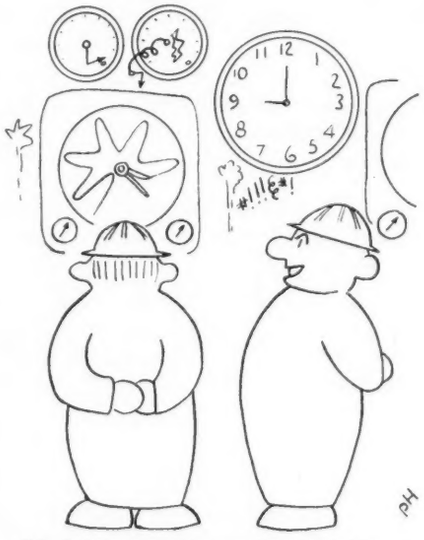
Description: Sesoxane, 2-(3,4-methylenedioxyphenoxy)-3,6,9-trioxaundecane, is readily soluble



in kerosene, Freon 11, Freon 12, and other solvents. It is easy to formulate in conventional equipment, and leaves no residue on evaporation. Manufacture is in pilot plant quantities. Properties are:

Color	straw to light amber
LD_{50} (mg/kg)	2000
odor	pleasant, mild
Physical state	liquid
purity	greater than 95%
Refractive Index (@ 20°C)	1.491 - 1.493

(Sesoxane is available from Fine Chemicals Div., Shulton Inc., Dept. CP, 45 Rockefeller Plaza, New York 20, N.Y. . . . or for more information check 2104 on form opposite last page.)

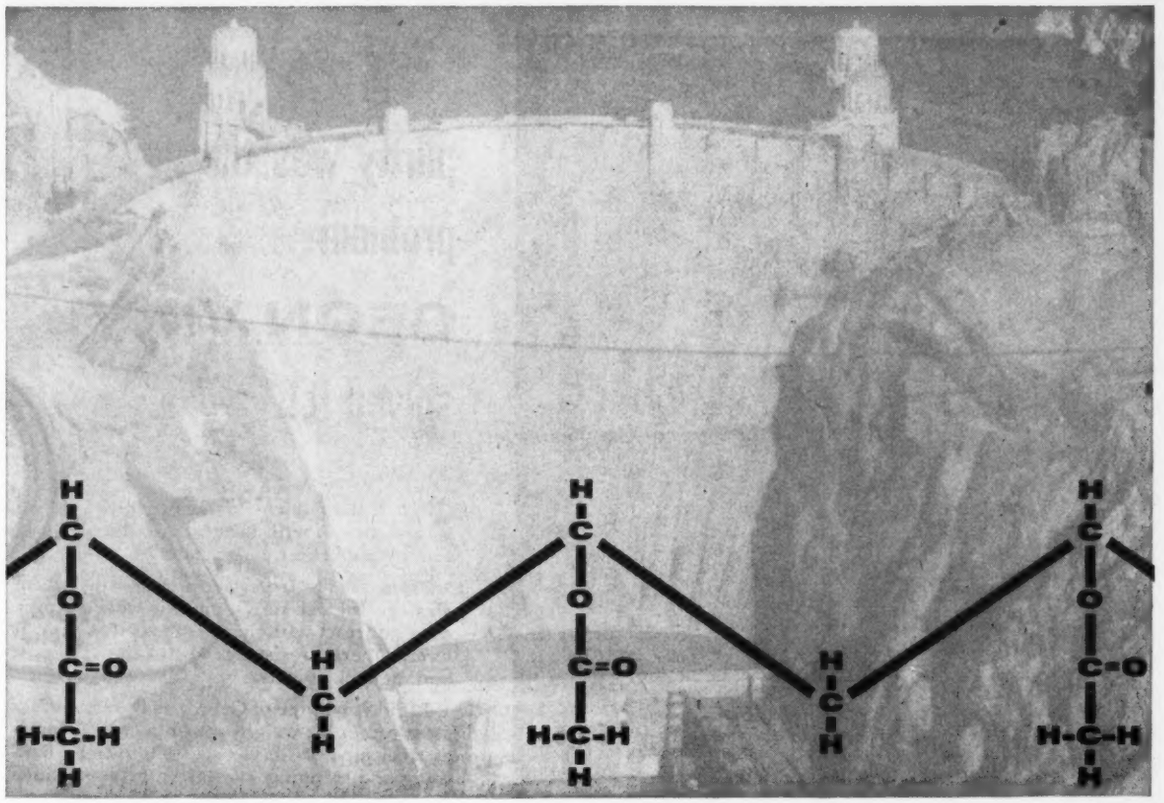


"Judging from the amount of tobacco juice and pencilled epithets on the instrument panel, I'd say the boys on the 12-to-8 had a rough time last night!"

Credit this cartoon to Paul Hogroian, E. I. du Pont de Nemours & Company, Inc., Louisville, Ky.

NOW! GREATEST WATER RESISTANCE

—without sacrificing any other feature



NEW PVAc HOMOPOLYMER EMULSION

National's new PVAc Homopolymer Emulsion 25-1014 offers more water resistance than any other emulsion of its type known to National's chemists. Moreover, other important features are not sacrificed:

- excellent binding power
- borax compatibility
- free filming
- crystal clear films even after exposure to heat
- high gloss
- nonsettling at low solids
- freeze-thaw stability even when plasticized with 15% dibutyl phthalate

Write now for data on new PVAc Emulsion 25-1014. Or ask to see a Resyn® specialist from National.

RESIN DIVISION

National

STARCH PRODUCTS INC.

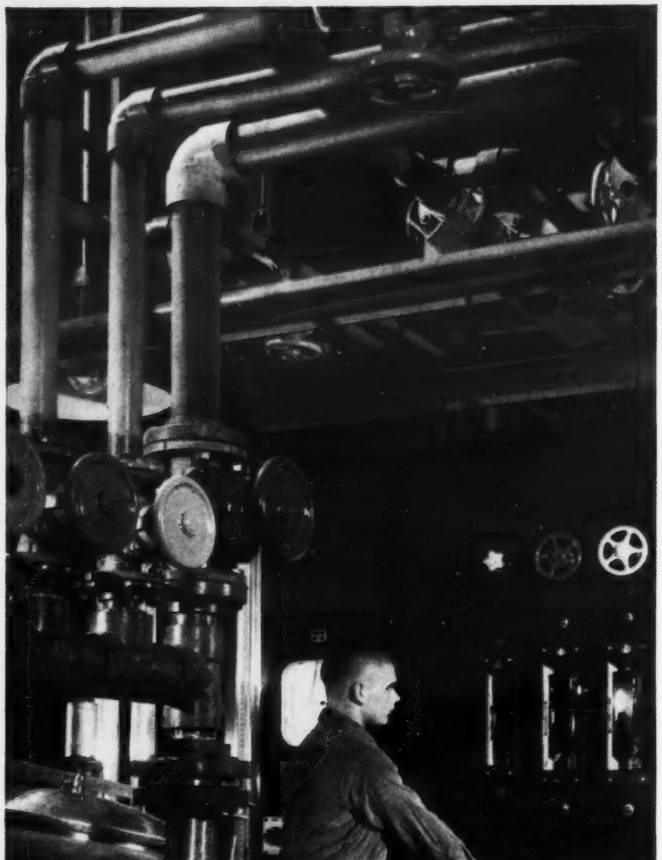
CHEMICAL PROGRESS WEEK-APRIL 8-12

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

When inquiring check 2105 opposite last page

Another new development using

B.F.Goodrich Chemical *raw materials*



purity was the problem... GEON VINYL solved it!

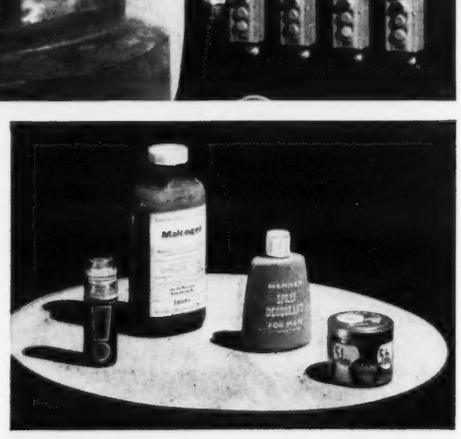
SINCE the fine chemicals processed in this plant react with metallic piping, and thus acquire impurities, a new material was needed.

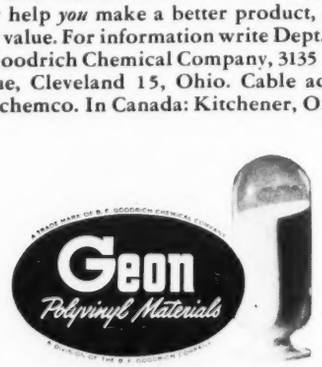
Piping made from Geon rigid vinyl resin was the logical solution. This durable pipe does not react with the chemicals it carries. It offers superior resistance to oils, acids, alkalis, and most chemicals.

Rigid vinyl pipe of Geon was the *economical* solution too. It weighs only one-fifth as much as steel pipe of similar size, simplifying handling and shipping. It's easily installed, since pipe and fittings are joined quickly with solvent cement.

Geon is a remarkably diverse family of polyvinyl materials . . . star performers for rigid products like piping, valves, housings . . . flexible wall coverings, weatherstripping, foam products . . . coatings for steel, paper, or textiles. One member of the Geon family can surely help *you* make a better product, offer a better value. For information write Dept. DD-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Rigid vinyl piping *at the Rebeis Company, Inc., Berkeley Heights, N. J., handles fine chemicals used in many leading pharmaceutical and cosmetic products. Pipe and fittings for this installation were manufactured by Alpha Plastics Inc., Livingston, N. J.*





B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check 2106 opposite last page

Controls gelling, skinning in tung oil/phenolic varnishes . . .

here's a new use for an established product that also permits cost reductions

Uses: To prevent gelling in cooking kettles and skinning of tung oil/phenolic resin varnishes.

Features: Using this agent as part of the resin content, it is possible to extend gel time of cooks at a given cooking temperature, thus increasing the ease of controlling such varnish cooks. This can be accomplished without decreasing the viscosity or increasing appreciably the cooking time. In the same process, better storage-skinning control of finished varnish is obtained.

A clear product results. Savings are effected in para-phenylphenol varnishes by lower total resin cost and because less aromatic solvent is necessary to produce a clear varnish.

Description: Nevillac Hard, a higher melting member of the established series, offers these advantages when incorporated at 10-20% on total resin. Nevillac Hard is a phenol-modified coumarone-indene type of resin, softening at 70-80°C (ball and ring) and having a sp gr of 1.125 @ 15.6°C.

(Nevillac Hard resin is a product of Neville Chemical Co., Dept. CP, Neville Island, Pittsburgh 25, Pa. . . . or for more information check 2107 on form opposite last page.)

Expanded foam polyethylene has its typical qualities plus low density . . .

offered as semi-finished molded components, foam is easily worked

Uses: Available as semi-finished molded components such as rings, blocks, rods, and sheet, this foamed polyethylene can be used as gasketing, radiation shielding, low-temp insulation, industrial floats, shock absorbers, packaging, and many other applications.

Features: Regardless of its final density, the foam retains all of the excellent basic properties of polyethylene. Some properties are actually improved; for example, the electrical properties. Chemical and solvent resistance is also high. Moisture resistance is slightly less than conventional non-expanded polyethylene. The foam also resists fungus growths, flaking, dusting, and is odorless and non-toxic.

Description: The expanded foam polyethylene has a uniform small-sized closed-cell structure. Individual cells contain an inert, non-toxic, odorless gas. By varying the amount of expanding ma-

terial, density can vary between 10 and 50 lb/cu ft. Foam can be easily fabricated with common wood and metal working tools. Manufacturer can also supply structures to customer specifications, if desired.

Typical properties of the foam are:

	Value	Variation as density increases
Density (lb/cu ft)	29	Incr.
Tensile strength (psi @ 73°F)	680	Incr.
Water absorption (%)	0.04	Decr.
Load deformation (%, 100 psi for 3 hr)	3	Decr.
Recovery (1 hr after the 100 psi load, %)	93	Incr.
Dielectric constant		
10^3 cy	1.5	Incr.
10^4 cy	1.5	Incr.
Dielectric strength (vpm)		
Short time (0.125")	220	Incr.
Step by step (0.125")	190	Incr.

(Agilene-F is a product of American Agile Corp., Dept. CP, PO Box 168, Bedford, Ohio . . . or for more information check 2108 on form opposite last page.)

Bodying and non-settling agent for paint is non-heat sensitive . . .

can be used on any type of mill

Uses: For coatings, inks, and caulking compounds where it prevents settling, gives good bodying.

Features: Agent is not heat sensitive. It thickens, prevents settling and penetration, improves color and sheen uniformity, improves brushability, and eliminates sagging. It can be used on any type of grinding equipment. As a non-settling agent, it is twice as effective as aluminum stearate.

Description: Bodying agent is a processed clay. It forms a colloidal gel with the vehicle to colloidally disperse pigment and vehicle.

(Troykyd Compound ABC is a product of Troy Chemical Co., Dept. CP, 338 Wilson Ave., Newark, N.J. . . . or for more information check 2109 on form opposite last page.)

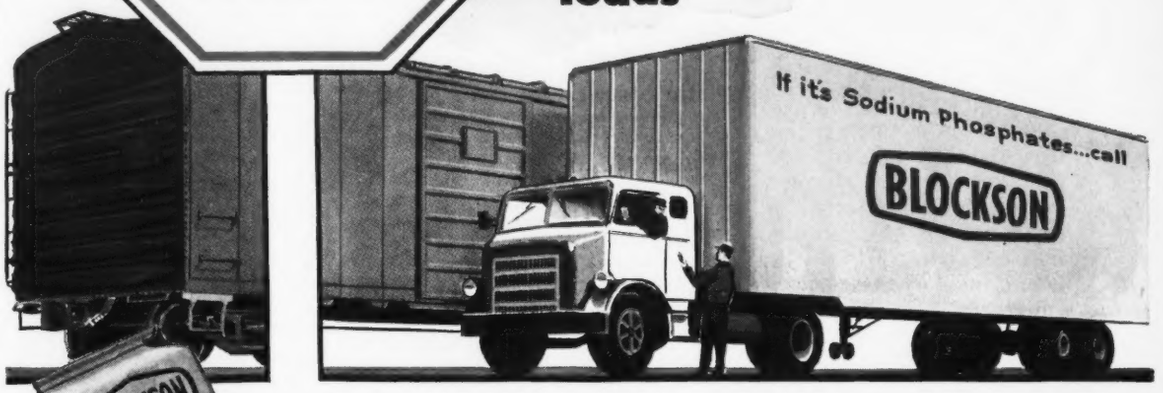
Gives technical information on vinyl chloride resins

Six Exon vinyl chloride resins for solution coatings are described in 34-page compendium of six sales-service bulletins.

Bul No. 23 is issued by Firestone Plastics Co., a Div. of the Firestone Tire and Rubber Co., Dept. CP, Pottstown, Pa. When inquiring check 2110 on form opposite last page.

ONE STOP FOR SODIUM PHOSPHATES

it pays to order BLOCKSON phosphates in mixed car or truck loads



You can combine any or all Blockson chemicals in one car or truckload and receive the carload price on each item. You'll find that this "one stop" purchasing simplifies your scheduling. A collect phone call to Blockson instantly expedites any unforeseen needs.

You'll carry far less inventory, since Blockson can be depended on to vary the flow of Phosphates precisely to your changing requirements regardless of changing market conditions. For further information, call Blockson or your Blockson distributor.

BLOCKSON CHEMICAL COMPANY
Division of Olin Mathieson Chemical Corporation
Joliet, Illinois

Also major producers of:
Hydrofluoric Acid
Sulfuric Acid
Sodium Fluoride
Sodium Silicofluoride
Hygrade Fertilizer
Teox 120
Nonionic Surfactant

WAREHOUSE STOCKS AT ALL BLOCKSON DISTRIBUTORS

When inquiring check 2111 opposite last page

TC
TENNESSEE CORPORATION

INDUSTRIAL CHEMICALS

We mine Copper, Sulfur, Iron and Zinc and are basic producers of their chemical derivatives. Our technical know-how and basic position in these minerals is your assurance of exacting quality control, strict uniform consistency and a plentiful supply.

COPPER

COPPER SULFATE
Industrial Crystals and all common grades.
MONOHYDRATED COPPER SULFATE
35% Copper as metallic packaged in steel drums at no extra cost.
COPPER CARBONATE
55% Copper as metallic. Light and dense grades.
CUPRIC CHLORIDE
37% Copper as metallic. Available in poly-lined drums or bags.
CUPRIC OXIDE
Minimum 76% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.

SULFURIC ACID
LIQUID SULFUR DIOXIDE
Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.
CHLOROSULFONIC ACID
Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.
SODIUM HYDROSULFITE
T-C HYDRO is a dry, white, free flowing, crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.

SULFUR

PARA TOULENE SULFONIC ACID, ANHYDROUS
Other organic Sulfonic Acids.

ZINC

MONOHYDRATED ZINC SULFATE
36% Zinc as metallic. White, free flowing powder.
ZINC OXIDE
Secondary Zinc Oxide.

IRON

FERRIC IRON SULFATE
Partially hydrated, free flowing granular form. Available in bags or bulk.

MANGANESE

MANGANESE SULFATE
65% Mn SO_4. Designed specifically for inclusion in mixed fertilizer.
MONOHYDRATED MANGANESE SULFATE
93% Mn SO_4, H_2O. Highest purity, technical grade . . . NOT A BY-PRODUCT.
MANGANOUS OXIDE
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

Samples, specifications and detailed information available upon request.

TENNESSEE TC CORPORATION
617-29 Grant Building, Atlanta, Georgia

When inquiring check 2112 opposite last page

CHEMICAL MATERIALS

Announces production of sorbitol . . .

will market 70% aqueous solution initially

An additional source of sorbitol solution, widely used as a humectant or moisture conditioner, has been made available. Initially, a 70% aqueous solution will be marketed. Other forms of the product will be added to the line as manufacturer's plans develop.

(Sorbitol solution is being produced by Merck & Co., Inc., Dept. CP, Rahway, N.J. . . . or for more information check 2113 on form which is located opposite last page.)

Lithium chemicals featured in products list

Chemicals, metals, ferro alloys, and mineral products are covered in 12-page products list. Lithium chemicals, including information on development-size quantities, are featured. Specs and analyses accompany product listings.

Products List is issued by Foote Mineral Co., Dept. CP, 18 W. Chelten Ave., Philadelphia 44, Pa. Specify 2114 on form opposite last page.

Improved silicone rubber can stand temperatures up to 600°F

Uses: Sealing industrial oven doors and other high temp applications.

Features: Compound can withstand intermittent temp as high as 600°F. It may be tinted any color and may be easily calendered.

Description: The 50 Duro-compound in company's high-temp silicone rubber series can be made harder by adding certain diatomaceous fillers. It has good processing characteristics for ex-

Facts about
CHLORINATED SOLVENTS

Users: Consider these figures! Tri-Chlor, $1.50/gal.; Per-Chlor, $1.68/gal.; cost of recovery, 2c/gal.

This savings can quickly amortize your investment in recovery equipment. If you evaporate solvents, you'll be money ahead with a Barnebey-Cheney Automatic Solvent Recovery System. Write for free Bulletin 821-57.

Activated Charcoal is the modern Alchemist that transforms waste vapors into re-useable solvents.

Activated Carbon, Purification & Recovery Equipment
BARNEBEY-CHENEY
Columbus 19, Ohio – St. Johns, Quebec

When inquiring check 2115 opposite last page

PREFERRED FOR
PAINT PRODUCTS
Tamms

SILICA
Amorphous, Crystalline and Diatomaceous in various grades for paints, fillers and enamels.

MAGNESIUM SILICATE
A finely ground, very white extender pigment and suspension medium.

CHINA CLAY AND KAOLIN
The purest, smoothest and whitest clays produced. Ideal for pastes and cements.

WHITING
Imported and domestic grades for paints and fillers and also for the pottery trades.

DIATOMACEOUS EARTH
A special grade for paint grinders' use as a suspension and flatting agent.

ALSO MINERAL BLACK AND RED OXIDE

Send for prices and samples.

DEPT. RM-25
TAMMS INDUSTRIES, INC.
228 N. LA SALLE ST., CHICAGO 1, ILL.

When inquiring check 2116 opposite last page

trusion and calendering, and has low shrinkage and low water absorption.

(SE-751 silicone rubber is product of Silicone Products Dept., General Electric Co., Dept. CP, Waterford, N.Y. . . . or for more information check 2117 on form opposite last page.)

Dry form of vitamin E will not melt or liquefy at processing temp

Uses: For production of multivitamin tablets and dry granular preparations.

Features: Improved dry form of DL-α-tocopherol acetate will not melt or liquefy at processing temperatures or when mixed with other vitamins to cause sticking and binding in tablet dies.

Description: Dry vitamin E acetate powder 25% contains 250 International Units of vitamin E per gram. All components of granule are easily digested.

(Dry vitamin E powder is product of Hoffman-La Roche Inc., Dept. CP, Nutley 10, N.J. . . . or for more information check 2118 on convenient Reader Service slip opposite last page.)

Polyethylene destaticizers

Five-page bulletin describes Electrosols D, M, S-1, and S-1-X destaticizers for polyethylene. Outstanding properties, applications, recommendations, and specs are covered.

"Antistatic Agents for Polyethylene" is issued by Alframine Corp., Dept. CP, 72-76 Putnam St., Paterson 4, N.J. When inquiring check 2119 on form opposite last page.

For more information on product at right, specify 2120 . . . see information request blank opposite last page.

DU PONT

CHEMICAL ENGINEERING NEWS

LATEST PROPERTY AND APPLICATION DATA ON TEFLON®

Packings and gaskets of Du Pont TEFLON® resist corrosion, high temperatures . . . reduce maintenance costs

PACKINGS OF "TEFLON" tetrafluoroethylene resin provide uniform packing performance and long service life. Solid packings are impervious to liquids and gases. Low frictional coefficient of TEFLON reduces torque . . . increases mechanical efficiency. In addition to the above, impregnated asbestos packings and plastic packings are also available.

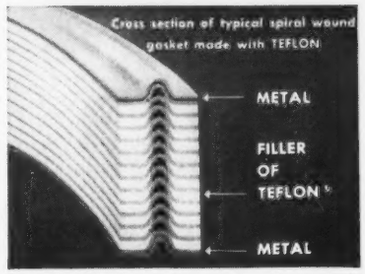
ENVELOPE GASKETS of TEFLON consist of a soft filler covered by a jacket of TEFLON. They are used for sealing large diameters and where bolting pressures must be limited, as in glass-lined equipment and pipe made from ceramics.

When conventional packing and gasketing materials give you trouble, replace them with gaskets and packings of TEFLON tetrafluoroethylene resin in these "hot spots." Considerable savings from decreased downtime and lower maintenance costs have been experienced by many who have specified TEFLON.

For example, when a pump, worn out from handling silicon tetrachloride at 2000 to 2500 lb./sq. in. was dismantled for servicing, the original packing of TEFLON was still in place. The former packing required servicing every 2 or 3 days. In another case, ring gaskets of TEFLON on standard pipe flanges were exposed to mixtures of nitric and sulfuric acids at 428°F. The gaskets are still giving satisfactory service after 26 months. The previous material had lasted one month or less.

TEFLON tetrafluoroethylene resin is inert to nearly all chemicals and solvents in commercial use. Exceptions to this include attack by the alkali metals under certain conditions. At high temperatures and pressures, halogens and certain halogenated chemicals may also affect TEFLON.

TEFLON has the lowest coefficient of friction of any solid in commercial use. For this reason, less torque is needed to turn shafts and stems when packings of TEFLON are used. Du Pont TEFLON remains tough over a wide range of temperatures. It can be employed up to 500°F. and displays excellent properties at very low temperatures. Water absorption is less than 0.1% (ASTM D570-42). Sticky or viscous materials do not adhere to its waxy surface. TEFLON is specified for electrical applications because of its high dielectric strength and extremely low power factor.



SPIRAL-WOUND gaskets and gaskets made from asbestos and glass cloth impregnated with TEFLON are used in high-pressure installations such as pipe joints, reaction kettles, steam couplings, pump bodies, pressure tanks.

* * *

You can help insure the reliability and long life of your process equipment by specifying gaskets and packing of TEFLON. Components of TEFLON will help cut your maintenance costs and downtime — perhaps in a spectacular way. For more information, simply fill out and mail the coupon.

TEFLON®
is a registered trademark . . .
TEFLON is the registered trademark for Du Pont tetrafluoroethylene resin, and should not be used as an adjective to describe any other product or any component part; nor may this registered trademark be used in whole, or in part, as a trade name for any product.

SEND FOR INFORMATION

Mail this coupon for additional property and application data on TEFLON.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept.
Room 83, Du Pont Building, Wilmington 98, Delaware
Please send me more information on Du Pont TEFLON tetrafluoroethylene resin. I am interested in evaluating this material for

_____

Name _____

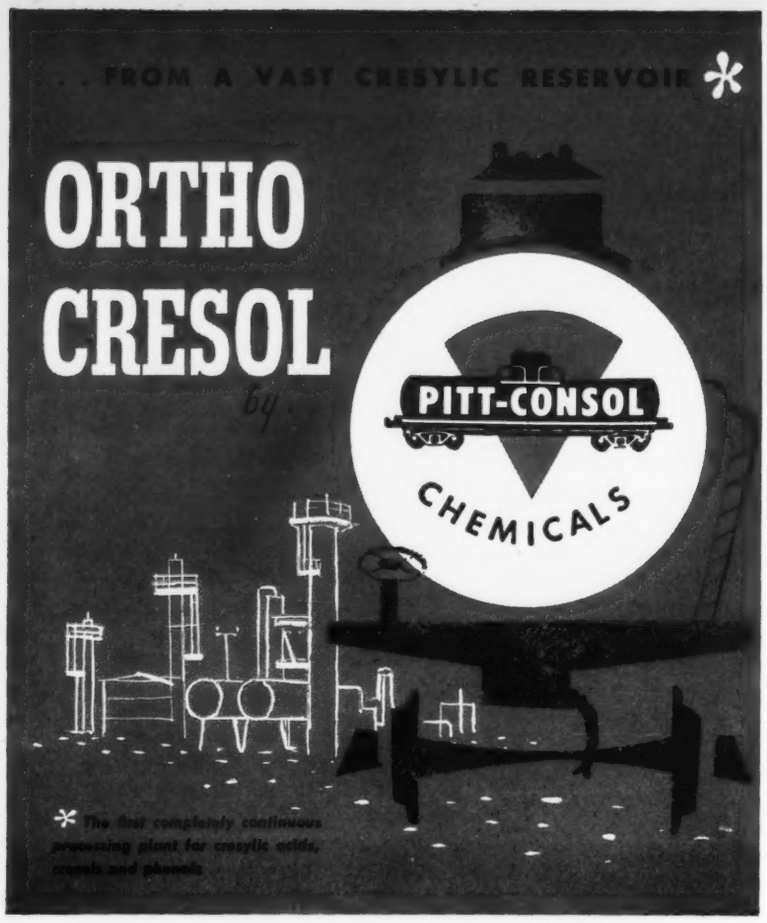
Company _____ Position _____

Street _____

City _____ State _____

Type of Business _____

In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec


. . . FROM A VAST CRESYLIC RESERVOIR *
ORTHO
CRESOL
PITT-CONSOL
CHEMICALS
* The first completely continuous processing plant for cresylic acids, cresols and phenols

When you need a dependable source for top quality ORTHO CRESOL in *volume*, you can count on PITT-CONSOL to deliver . . .

After years of research PITT-CONSOL has developed a new, continuous process for producing ORTHO CRESOL of high purity. With an abundant raw material supply of petro-chemical and coal tar origin, PITT-CONSOL offers a reliable reservoir from which you can draw your ORTHO CRESOL needs. Up-to-date equipment operated by skilled technicians, and modern analytical control methods assure consistent uniform quality. Close proximity to road, rail, and water simplify delivery.

PITT-CONSOL can supply in bulk quantities meta para cresols, cresylic acids, phenols, and xylenols . . . For more information or complete technical assistance, please write or call.

PITT-CONSOL CHEMICALS

PITT-CONSOL
CHEMICAL COMPANY
191 DOREMUS AVE., NEWARK 5, N. J.

A SUBSIDIARY OF PITTSBURGH CONSOLIDATION COAL CO.

When inquiring check 2121 opposite last page

Brings titanium trichloride out of the test tube stage and into availability

$TiCl_3$ is used with an initiator to catalytically produce Ziegler and Natta-type polymers

Uses: To be used in the catalytic production of high crystalline polymers of isotactic structure such as of propylene, butene, styrene, and ethylene. This has been described in recent literature by Ziegler and Natta.

Other reactions include use as a catalyst in the preparation of *cis*-polybutadiene rubber, and for the Friedel-Crafts reaction. A strong reducing agent, titanium trichloride has been used in the reduction of nitroguanidines and in a reductometric method for estimating sulfoxides.

Features: It has been found that certain catalysts promote "stereospecific" polymerization. This term means that the molecules polymerize in specific structures. This gives rise to polymers that have an unexpected capacity to crystallize and thus have higher melting points than their amorphous counterparts, for example, the Ziegler-type polyethylenes. Secondly, these polymerization conditions are milder than similar reactions without catalysts.

Some catalysts work better than others. The greatest stereospecificity is shown by titanium halide catalysts and aluminum-alkyl compounds. This varies considerably according to the type of halide and the aluminum-alkyl compound. For example, under similar polymerization conditions at 80-90°C, $TiCl_3$ and triethylaluminum give 85-95% isotactic polypropylene compared with 34-45% for a $TiCl_4$ and triethylaluminum catalyst. For n-butene-1, the ratio is 60-70 as compared with 30-40; and for pentene-1, it is 30-40 as compared with 1-3.

Description: $TiCl_3$ is now available in quantities ranging up to hundreds of pounds. It has previously been available in ounce or gram quantities only. As illustrated above, experiments have shown sub-valance titanium to have better catalytic effect. This has spurred commercial development of the trichloride.

The $TiCl_3$ is 99+% subchlorides, the "average" is equivalent to $TiCl_{2.9}$. Particle size is 10-100 microns. No handling difficulties are anticipated at room temp, however it will burn if heated above 400°C. Because of its acidic nature, direct contact with the compound or its solutions should be avoided.

($TiCl_3$ is a product of Stauffer Chemical Co., Dept. CP, 380 Madison Ave., New York 17, N.Y. Check 2122 opposite last page.)

Fatty Acid Esters

Stearates
Laurates
Oleates
Ricinoleates

Wetting Agents
Thickeners
Plasticizers
Emulsifiers

MADE TO MEET YOUR SPECIFICATIONS

THE FLAME AND THE FLASK — SYMBOL OF QUALITY

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
5147 W. 67th Street, Chicago 38, Illinois
AKRON, OHIO • NEWARK, N. J.
CHICAGO, ILL. • LOS ANGELES, CAL.

When inquiring check 2123 opposite last page

Very stable yellow pigment has strong color intensity . . .

pigment won't separate, chalking is yellow

Uses: As a yellow pigment for exterior coatings.

Features: Very stable, pigment won't separate. Pigment has the excellent properties of manufacturer's Sun Yellow N, but is more intense in mass tone and stronger in tint. It handles similarly to rutile titanium dioxide. Chalking is about the same, but it is yellow, not white.

Description: Sun Yellow C is a calcined nickel titanium dioxide pigment and represents the brightest yellow ever offered in this type of color. It is a non-bleeding, pastel yellow of high opacity.

(Yellow pigment is a product of The Harshaw Chemical Co., Dept. CP, 1945 E. 97th St., Cleveland 6, Ohio. Check 2124 opposite last page.)

Resin cuts costs, eases handling of latex and emulsion paints

Four sheet bulletin describes a resin for emulsion and latex paints that is low in price, improves paint qualities, and facilitates handling. Three formulas for acrylic emulsion paints are given.

"C-12 Resin for Emulsion and Latex Paints" is issued by Farnow, Inc., Dept. CP, 4-83 48th Ave., Long Island City 1, N.Y. When inquiring check 2125 on form opposite last page.

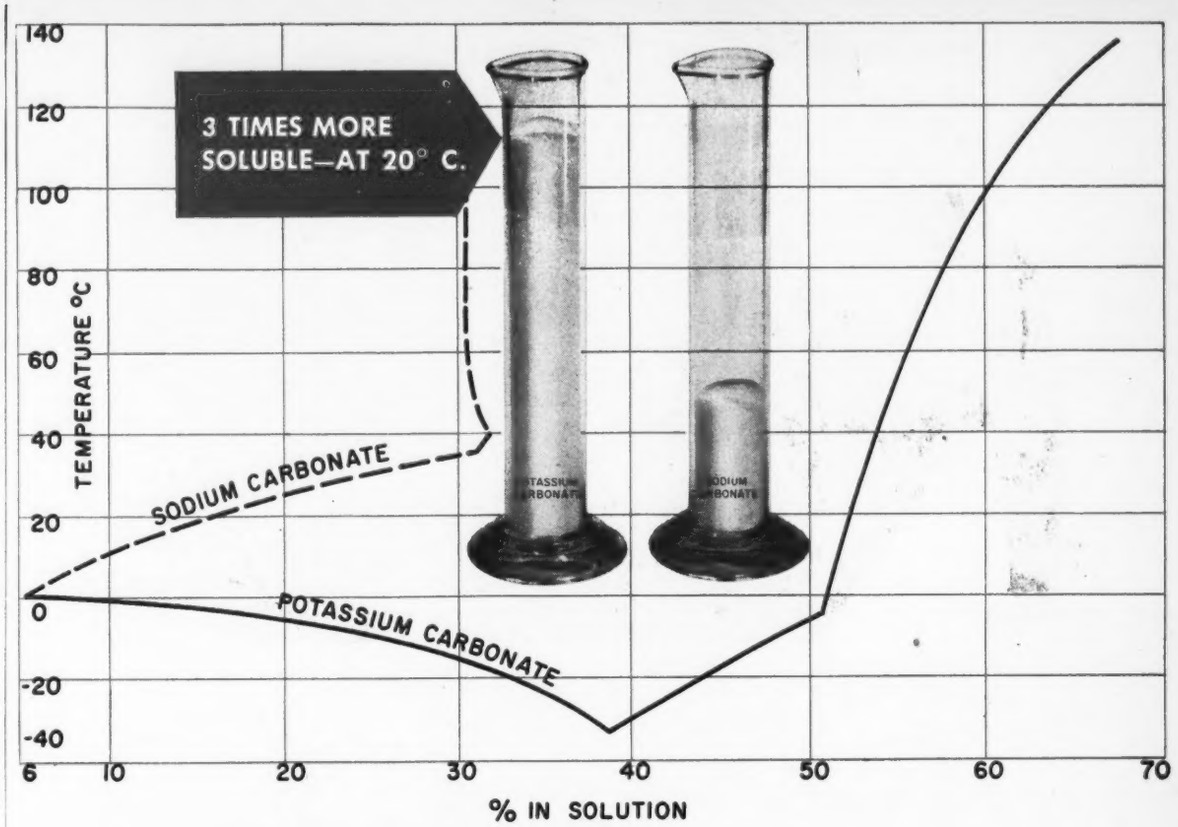
featured next month—

Chemical Materials

Are you tired of wading through long, tedious, confusing annual listings of new chemical products in order to keep up-to-date on what's new?

If so — then try skimming through our listing next month. You won't even realize that our listing is bigger than others you may have seen elsewhere, because it's so thoroughly indexed that you can find just what you want in no time at all.

Don't forget — April CHEMICAL PROCESSING's Chemical Materials section!



For higher solubility...
For more concentrated solutions...
Use Solvay POTASSIUM Carbonate

SOLVAY Potassium Carbonate is 3 times as soluble as sodium carbonate (soda ash) at room temperatures. This higher solubility permits the use and packaging of more concentrated solutions. In addition, the products of reaction with potassium carbonate are more soluble than those with sodium carbonate. Our chart shows the greater range of solubility . . . the wider range of temperatures at which it is effective.

In many fields substantial savings are being made by the switch to SOLVAY *Potassium* Carbonate. With it soap makers can add more builder to liquid cleaners. It also offers advantages in chemical processing, synthesis gas scrubbing, boiler feed-water treatment and cleansing.

Learn how you may apply SOLVAY Potassium Carbonate to your product or process.

Write for samples . . . information!

SOLVAY

Aluminum Chloride • Ammonium Bicarbonate
Potassium Carbonate • Monochlorobenzene
Vinyl Chloride • Calcium Chloride • Soda Ash
Sodium Nitrite • Snowflake® Crystals • Chlorine
Sodium Bicarbonate • Ammonium Chloride • Caustic
Potash • Methylene Chloride • Carbon Tetrachloride
Methyl Chloride • Cleaning Compounds • Caustic Soda • Chloroform
Para-dichlorobenzene • Ortho-dichlorobenzene • Hydrogen Peroxide

Allied Chemical

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Please send me without cost:

☐ Working sample of SOLVAY Potassium Carbonate
☐ SOLVAY Potassium Carbonate fact book

Name_____
Position_____
Company_____
Address_____
City_____ Zone_____ State_____

DS-3

When inquiring check 2126 opposite last page

"Nerve center" of malt house is electronically operated control panel. It registers and regulates all variables in each of the five germinating-kilning compartments for precise control of the entire process

In 1950, engineers at Albert Schwill and Company began planning a new type of malting plant. Occasion for the plans was need for increasing plant capacity. Reason for questioning conventional malting methods was management's belief that more uniform control of the malting process was possible — with better instrumentation.

Result of the experimental work was a completely different approach to the traditional problems of malting. A "ranch style" malt house was designed which operates all on one floor. Malting compartment serves for both germinating and kilning. A 100-ton moving floor of stainless steel serves as conveyor in each compartment for minimum of mechanical handling. Electronically-controlled instrument system was installed for precise operation and increased efficiency.

Idea of the plant was sufficiently unique that a patent was recently granted covering it.

With regular production personnel, unique malting plant runs seven days a week, 24 hours a day using . . .

plug-in electronic components for less in-plant maintenance

Dual-purpose compartments are controlled by central electronic panel. Control system for each compartment provides flexibility for whatever conditions are required by grain in process. Only helices of turning machine touch the grain during growing and kilning. Moving floor transfers the grain to a conveyor after completion of process

WILLIAM C. CLARKE, Assistant Editor
TOM NELLIGAN, Vice President
Albert Schwill and Company
Chicago, Illinois

Problem: To insure exact duplication of pilot malting runs, production runs at Albert Schwill and Company, Chicago, Illinois, must be according to precise, controlled conditions — within temperature limits of ±1°F throughout an entire batch lot approximately 100 tons.

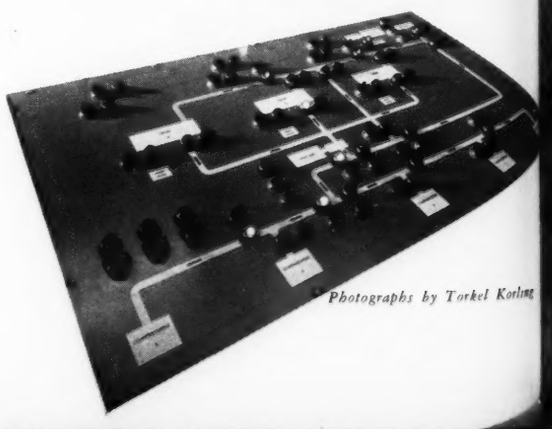
Unique malting plant of Albert Schwill and Company in Chicago, Illinois, is built to make possible precise control of processing conditions . . . seven days a week, 24 hours a day. But plant personnel are maltsters — not skilled in instrument maintenance.

Solution: In 1951, engineers at Albert Schwill and Company began working on the problem of improving malting procedures. A unique malt plant was designed (and recently patented) by which precise control of process conditions became possible. Key to entire development was use of an electronic-pneumatic control system which could be adapted to the installation — and operated on 24-hour basis without any need for "standby" instrument maintenance personnel particularly on "off" shifts.

Requirements of the instrument system were that

(*Please turn to page* 62)

Graphic panel in steep house controls transfer of barley into any germinating compartment. Lights indicate path traveled by grain

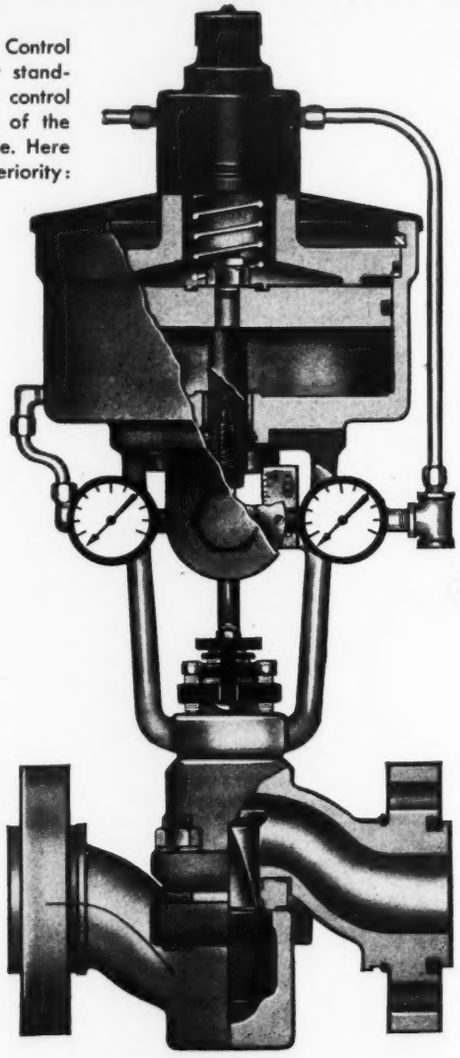


Photographs by Torkel Korling

LOW FIRST COST
LOWER INSTALLATION COST
LOWEST MAINTENANCE COST

CONOFLOW *Series LB* CONTROL VALVES

Users say Conoflow Series LB Control Valves save more from every standpoint than any other type of control valve. This is based on years of the toughest applications experience. Here are the major points of superiority:



INTEGRAL POSITIONER
No exposed moving parts. Convenient zero adjustment while in operation.

EASY TO INSTALL
Saves manhours. Compact, light yet strong.

PISTON POWERED
Sufficient power to operate under most adverse conditions. No diaphragm to fail.

INTEGRAL BONNET
Eliminates leakage at joints. Extra deep stuffing box for heavy duty packing. Oversized stem.

SINGLE-SEATED DESIGN
Guaranteed tight shut-off over long periods of time despite heavy wear.

RENEWABLE SEAT RING
Quickly replaced with valve still in the line. No threaded insertions to corrode.

STREAMLINED PASSAGEWAY
No cavities for accumulation of deposits to interfere with operation.

CC707

WRITE FOR BULLETIN LB-2-A

Cono-Controls®

CONOFLOW CORPORATION
2100 ARCH STREET, PHILADELPHIA 3, PA.

SUBSIDIARY OF WALWORTH

FOREMOST IN FINAL CONTROL ELEMENTS

When inquiring check 2127 opposite last page

Plug-in Electronic Components

(*Continued from page* 60)

it be reliable, flexible, and easily maintained. Electrical system with pneumatic operators was suggested by need for remote temperature indicating and recording. Plug-in interchangeable components were necessary to guarantee uninterrupted operations without "standby" maintenance personnel.

Each of five malting-kilning compartments is equipped with three sets of electrical resistor bulbs suspended into the malt beds. Each set consists of two bulbs, one about two feet above the other, with lower element approximately six inches above compartment floor. Electrical control signal from each thermometer automatically controls bed temperature throughout each compartment.

Bed temperature is maintained by passing air of desired temperature through perforated stainless steel floor of malt bed and by action of the turning machine.

Air temperature is considered quite critical — being held to $\pm 1^{\circ}$F on 100°F scale during germination and about $1\frac{1}{2}^{\circ}$F on 300°F range during kilning phase. Five thermostats are located in the air stream from the air heating furnaces — and refrigeration units — to maintain desired air temperature. The turning machine moves through the bed at about one foot per minute — turning the grain over and over.

Process is exothermic so tempered air must be used at all times to maintain desired temperatures. Cost of tempered air is reduced by using two sources of cooling — outside air and mechanical refrigeration. If wet bulb temperature of outside air is lower than set temperature of malt bed, outside air in proper proportions is drawn into process. Conversely, mechanical refrigeration supplies required cooling air if temperature of outside air is higher than required malt bed temperatures.

Complete instrument system consists of the primary element, transmitter, recorder or indicator, controller, manual-automatic control, and power relay.

Temperature is measured by a fixed bridge circuit, with output of 0.0 to 0.500v AC for full temperature span. Temperature transmitter is compensated for ambient temperature changes.

Unbalance between the output of the transmitter and the balancing transformer in the recorder and indicator is amplified to drive a rotary-solenoid motor for positioning the pen.

Controller uses the same input voltage from temperature transmitter for comparison to an AC reference signal from calibrated set point. Difference is used to actuate power relays to control pneumatically air tempering equipment. Air stream temperature to malt bed is thus held at

desired level. Manual controller operates independently of the recorder and controller. With setting of "Manual", either recorder or controller can be removed from service.

Although basic operation of the system is electronic, circuitry is simple and straightforward. Vacuum tubes are used only in the recorder and controller, both of which are plug-in components at the control panel. Should component failure occur, simple exchange of units at control board puts control system back into operation.

Results: Malting plant has been in continuous operation since early 1956, approximately one year. System has proved so dependable that plant personnel does not even include an instrument maintenance man. In-plant maintenance has consisted only of checking tubes and replacing them. If component failure is not repaired by this expedient, entire component is returned to manufacturer for repair.

(Autronic control system is product of The Swartwout Company, Dept CP, 18511 Euclid Avenue, Cleveland 12, Ohio . . . or for more information check 2128 on form opposite last page.)

(Patented malting plant was developed by Albert Schwill and Company, Dept CP, 141 W. Jackson Blvd., Chicago, Illinois . . . or for more information check 2129 on form which is located opposite last page.)

WANTED:

BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

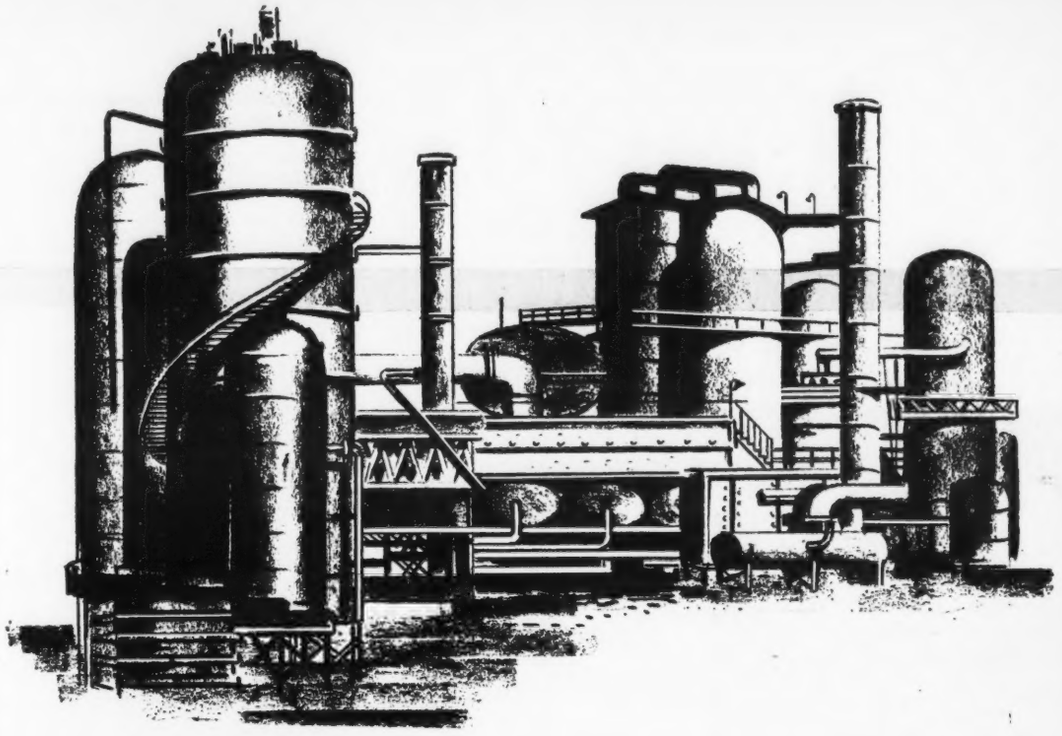
Worth $10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for *$10*, paid on acceptance.

Worth $5—Cartoon *ideas* . . . a written description or rough sketch of scene, and a caption . . . worth *$5*, on acceptance.

Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

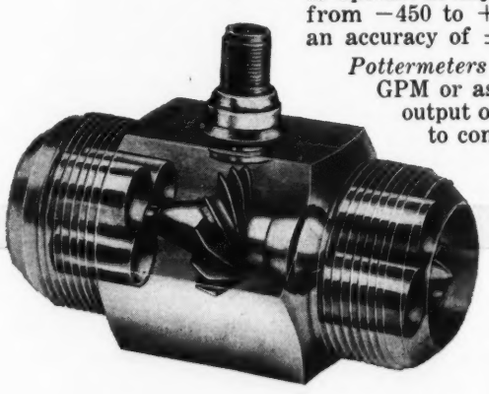


FOR VITAL FLOW CONTROL

WHETHER you're developing a new process or modernizing an old one—investigate the unique characteristics of the bearingless *Pottermeter*.

This electronic flowmeter—easily installed in any type of piping to operate at any angle, at any pressure and at temperatures from −450 to +1200°F, measures flow of any liquid with an accuracy of ±½ of 1%.

Pottermeters are available to measure flows as low as 0.07 GPM or as high as 3,000 GPM. The inherently linear output of the *Pottermeter* makes it ideal for systems to control either flow rate or total flow.



Find out how the bearingless "floating rotor" used in the *Pottermeter* can give you more precise flow measurement, longer trouble-free service life, and more accurate flow control.

Write for Bulletin PS-1

Potter

POTTER AERONAUTICAL COMPANY

Route 22 • Union, New Jersey • Phone MUrdock 6-3010

Makers of "Potter Engineered" products

When inquiring check 2130 opposite last page

PATENTS APPLIED FOR

NEW USG Temperature Pilot

with automatic reset

Temperature, Reset and Expanded Ranges feature the enlarged U. S. Gauge line

The exclusive USG indicating, mercury-actuated temperature pilot is available in ranges from —40°F. to +1000°F.

Pressure and Temperature Pilots are available with or without automatic reset. When process conditions change, conversion kits make possible addition of automatic reset to existing installations.

With the new USG nested diaphragm pressure elements, vacuum and low pressure pilots never before available are now standard.

Only U. S. Gauge offers pressure pilots in ranges as low as 30 inches of water . . . as high as 10,000 pounds.

Write your valve supplier for complete details, or write us direct.

USG

UNITED STATES GAUGE

Division of American Machine and Metals, Inc.

Sellersville, Pa.

Home of the SUPERGAUGE

When inquiring check 2131 opposite last page

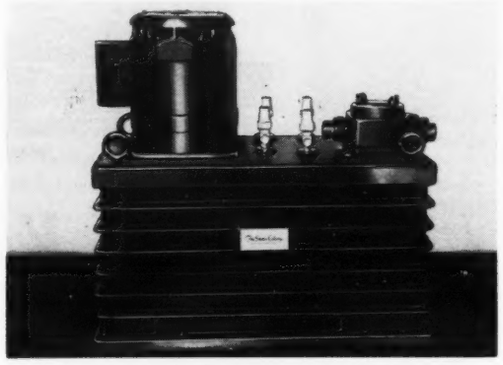
Combines electronic control with hydraulic operator . . .

speed of action reduces "hunting" and "lag" in controlling hydraulically operated valves

Uses: As control unit for high-speed hydraulic operation of valves. Power is provided to operate valves by hydraulic cylinders or fluid motors.

Features: Hydraulic control unit has high-speed reaction to received signal — sufficiently high-speed to reduce problems of "lag" and "hunting".

Description: Controller consists of electronic control element, four-way hydraulic valve, and motor-driven hydraulic pump. Hydraulic valve is operated by one of two electronic tubes. Case of unit serves as oil reservoir.



Electronic control elements are contained in cast iron case, submerged in oil. Motor-driven hydraulic pump is mounted on top cover of case

Manufacturer's hydraulic control units, while basically identical, are custom-designed for specific applications involving control of pressure, level, temperature, or flow. Sensitive master combination has been developed to provide desired control action for each application.

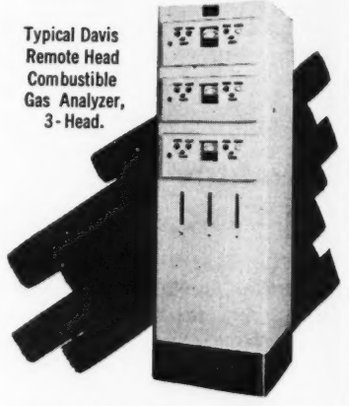
(Swisstrol is product of The Swiss Colony Engineering Division, Dept. CP, Monroe, Wisconsin . . . or check 2132 opposite last page.)

Rotary kiln instrumentation illustrated in folder

"Modern Practices in Rotary Kiln Instrumentation" is title of folder showing how instruments and controllers are used in manufacture of cement, lime, and other non-metallic products. Pictures of on-the-job installations and diagrams are used in discussing details of operation.

Folder N-0720(1) is issued by Leeds and Northrup Co., Dept. CP, 4934 Stenton Ave., Philadelphia 44, Pa. When inquiring specify 2133 on form opposite last page.

DAVIS COMBUSTIBLE GAS ALARM SYSTEM



Typical Davis Remote Head Combustible Gas Analyzer, 3-Head.

A detection and warning system that guards life, property and processes against the hazards of explosive gases and vapors.

If you deal with flammable liquids or gases, our engineers will gladly survey and estimate your needs, without obligation.

SEND FOR BULLETIN 11-36

INSTRUMENT DAVIS DIVISION

DAVIS INSTRUMENTS

A Division of Davis Emergency Equipment Co., Inc.

56 Halleck St., Newark 4, N. J.

When inquiring check 2134 opposite last page

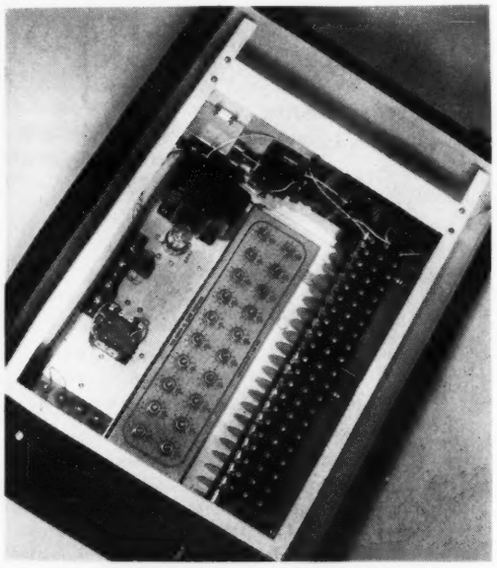
Allows frequent, easy changes in programed operations . . .

time ranges can be changed by substitution of single component—a one watt resistor

Uses: For timing operations to be programed in pre-selected sequence with each step in process being dependent upon time. Instrument lends itself easily to automation of processes involving batch operations, as coke quenching.

Features: Timing ranges of preselector can be changed easily by simple substitution of single component in circuit—a one watt resistor. Time of any operation can be preselected without changing time of other operations already selected.

Description: Preselector is a time control instrument and programer with 20 contacts which open and close independently and individually. Instrument consists of timing device, control panel, and rectangular frame. Timing device is elec-



Time interval controls can be adjusted independently for program control

tronically controlled with range of each time interval adjustable from 1/10 sec to 20 sec. Control panel has 20 potentiometers which are adjustable for intermediate time intervals. Rectangular frame consists of a solenoid-actuated shaft with 20 slotted discs. Each disc has 21 tabs, 20 of which represent time intervals. The 21st position is an unenergized position.

Accuracy of repeat time intervals is $\pm 2\%$ of individual time interval. Unit operates on 115v AC.

(Cat 200 Timed Operations Preselector is product of The Henry G. Dietz Company, Dept. CP, 12-16 Astoria Boulevard, Long Island 2, New York . . . or check 2135 opposite last page.)

Now get accurate moisture measurement . . . down to one part per million

CEC's new Type 26-301 **MOISTURE MONITOR**

The Type 26-301 Moisture Monitor is a portable, low-cost instrument which measures minute quantities of moisture present in gaseous mixtures. Developed to meet a wide range of industrial requirements, the instrument's versatility makes it equally adaptable to the process plant or analytical laboratory.

APPLICATIONS

These examples are typical of the many applications for which the 26-301 is ideally suited:

- Monitoring water content in natural-gas transmission lines.
- Gas-phase kinetic studies where water is involved in the reaction.
- Permeability determination of materials by measuring moisture absorption.
- Efficiency studies of drying systems.
- Examining rocket and missile gases for moisture prior to launching.
- Monitoring and control of water content of cylinder and bottled gases to assure moisture-free manufacture.
- Measuring and controlling moisture in air lines of precision instruments.
- Testing for water vapor in Freon to prevent freezing of expansion valves in refrigeration systems.

Equipped with an adjustable and accurate flow regulator and a meter calibrated in ppm, the 26-301 permits precise readings from 0 to 1000 ppm by means of a 5-step attenuator. Output of the analyzer can be telemetered to a remotely located recorder for monitoring or control. Price: $650.00, F.O.B. Pasadena. Please write for Bulletin CEC 1834-X7.

Consolidated Electrodynamics

CEC *300 North Sierra Madre Villa, Pasadena, California*

NATIONWIDE COMPANY-OWNED SALES & SERVICE OFFICES

When inquiring check 2136 opposite last page

Manual explains functions of motor control

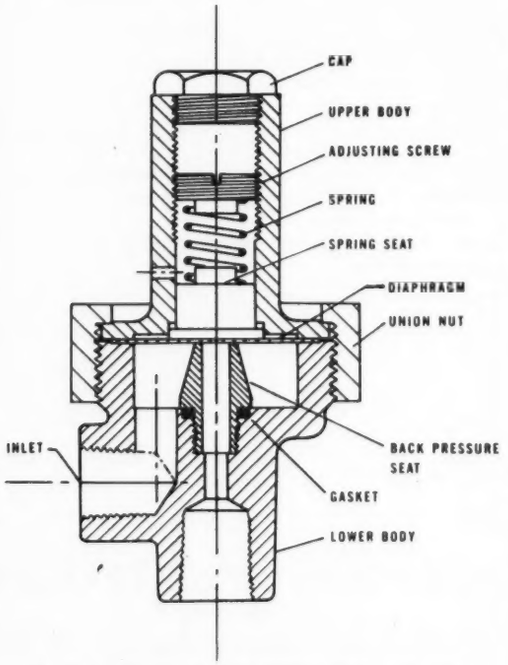
Operation and application manual of 32 pages covers control devices for electric motors. Motor control — what it is, how it works, what controlling devices are available and where to use them — is explained. Manual, magnetic, and reduced-voltage starters; pushbuttons; relays; limit switches; solenoids; pressure and vacuum, float, and plugging and anti-plugging switches are discussed. All equipment is well-illustrated.

GEA-6372 is issued by General Electric Company, Dept. CP, Schenectady 5, N.Y. When inquiring specify 2137 opposite last page.

Pressure settings of back-pressure and relief valves easily changed in the field . . .

valves are easily disassembled for cleaning and parts replacement

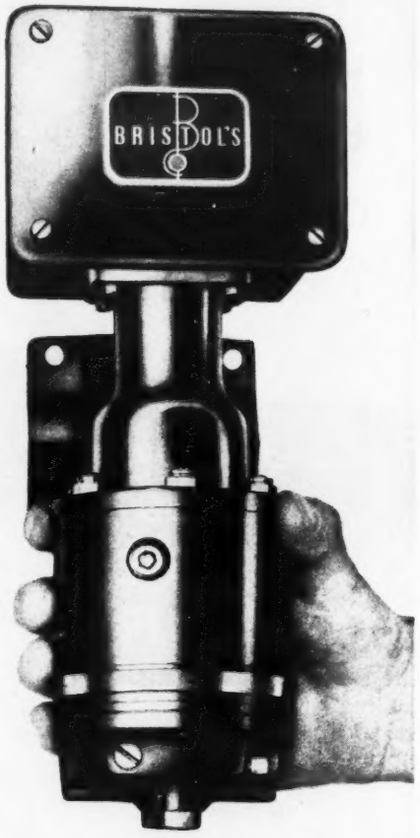
Uses: Units are designed for use with corrosive fluids at pressures to 1500 psi. Relief valves are for pressure relief of corrosive and non-corrosive fluids in low-flow systems (with manufacturer's controlled-volume pumps, for example.) Back-pressure valves are used in pumping systems where



Cutaway drawing of back-pressure valve. Top works of valve are protected by diaphragm and never come into contact with fluid

BRISTOL Metagraphic
offer broadest measurement

For temperature, pressure, vacuum, differential pressure, flow,



BRISTOL METAGRAPHIC PNEUMATIC TRANSMITTERS

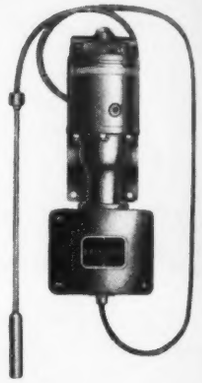
are the measuring centers of the Metagraphic transmission system. They are constructed for friction free operation, and provide superior control and high speed transmission, with low air consumption. Metagraphic transmitters are available for measuring practically any variable encountered in industrial processing.

PRESSURE, VACUUM

Ranges as low as 0 to 3" of water; as high as 0 to 10,000 psi.

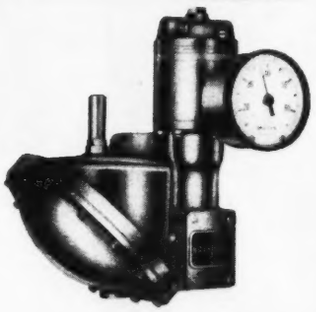
COMPOUND PRESSURE AND VACUUM

Ranges from 15" mercury to 0 to 150 psi.



TEMPERATURE

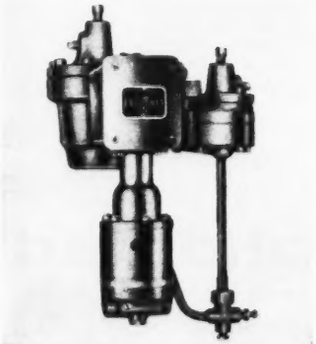
Ranges as low as —100°F, as high as 5000°F.



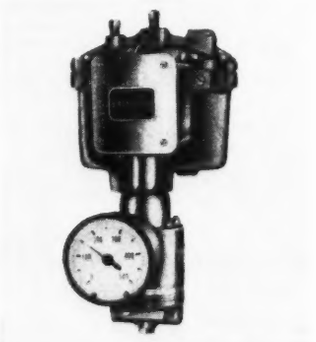
ABSOLUTE PRESSURE

Ranges as low as 0 to 5mm of mercury and up. Available in bronze or stainless steel.

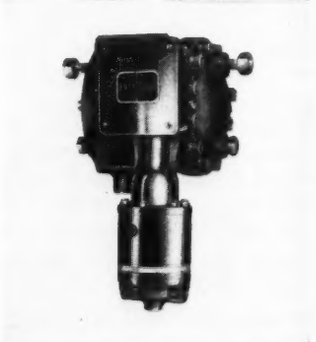
DIFFERENTIAL PRESSURE AND FLOW. Ranges as low as 0 to 1" water and up. Offered in a variety of meter bodies to satisfy almost any requirement or preference, including:



MERCURY MANOMETER



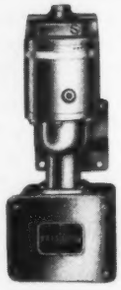
BELL-TYPE ELEMENT



DRY-TYPE METER BODY

pneumatic transmitters
range and widest coverage

liquid level, and mechanical motion

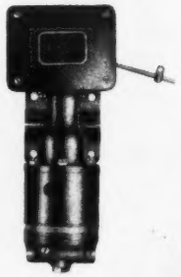


LIQUID LEVEL

Full range of applications from water and other liquids in tanks, open and closed vessels of all kinds; weirs, canals and reservoirs—pressure and bubbler types—for corrosive conditions and solid-bearing liquids.

MECHANICAL MOTION

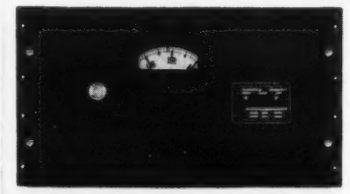
For measuring and transmitting any mechanical motion such as float motion, gate position, or valve stem action, as well as others.



Indicators can be furnished on all transmitters.

MEASURE ELECTRONICALLY, TRANSMIT PNEUMATICALLY

with Dynamaster Electronic Potentiometer Transmitter. Input signal may be a voltage, current or change in resistance, capacitance, or inductance. Output is a pneumatic signal proportional to measurement. Ideal for pH, speed, viscosity, density, strain, force, dew point and other measurements requiring electronic transducer.



Measure almost any variable, transmit universal 3-15 psi* pneumatic signal to a recording receiver or controller

Get the widest variety of pneumatic transmitters on the market in the Bristol 650 Metagraphic line.

They offer you more models and a variety of lower ranges, higher ranges and easily adjustable partial ranges that no other line of pneumatic transmitters can match. Check these Metagraphic advantages:

Easy maintenance. Spare parts are cut to a minimum with the Metagraphic transmitter. The reason: all transmitters are basically the same; only the measuring elements and their housings differ.

Uses standard Bristol measuring elements. The same standard, highly developed and proven Bristol measuring elements that are used in Bristol recording and controlling instruments are used in the Metagraphic transmitter. They are the result of 68 years of research and experience in building hundreds of thousands of instruments for practically every application, and incorporate the latest engineering developments in the field. These high-torque measuring elements, with wide-angle travel, give powerful, positive operation.

Rugged, weatherproof. Bristol Metagraphic transmitters are extremely rugged. They are weatherproof and can be installed anywhere.

Range easily adjustable. The locations of partial ranges are easily adjustable through wide range limits on most transmitters. The span of a given transmitter can also be changed without difficulty. It is therefore no longer necessary to know and specify the exact range in advance, when ordering transmitters.

Thousands of Bristol Metagraphic transmitters are already in operation, giving reliable, trouble-free service. Find out how their advanced design can simplify your measurement, recording, and control problems. Write the Bristol Company, 141 Bristol Road, Waterbury 20, Conn. 6.83

**Other transmitting pressures also available.*

BRISTOL'S

BRISTOL

TRAIL-BLAZERS IN PROCESS AUTOMATION

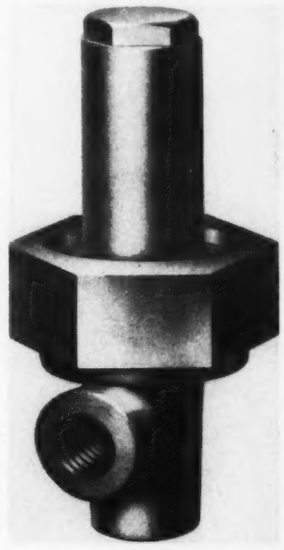
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

When inquiring check 2138 opposite last page

discharge pressure is lower than suction pressure.

Features: Pressure settings are easily changed in field.

Description: Valves are available in sizes from ¼ to 1". Slurries up to 15% concentration, with particle sizes up to 50 mesh, can be handled. Fluid temperatures are limited to 250°F. Both valves have Kel-F (or Teflon) diaphragms located between body and bonnet. All parts below diaphragm, in contact with fluid, are constructed of materials resistant to many fluids (stainless steel, Carpenter 20, or Hastelloy). Design of ball checks in relief valves produces snap-action and large-flow capacity. Relief valves open fully at set pressure and close tightly with very small drop in pressure below set value.



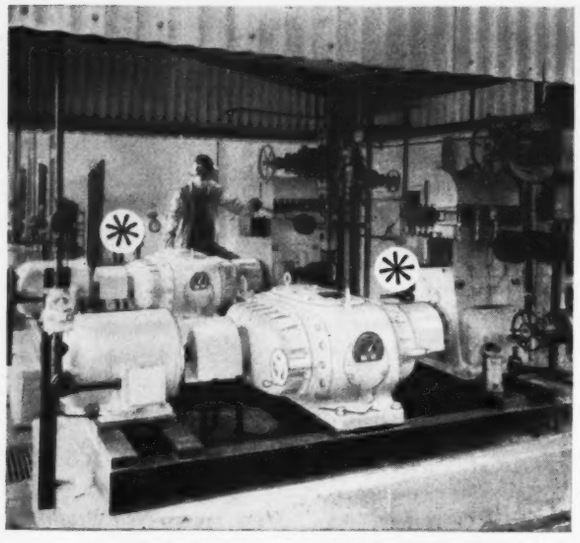
Valve can be easily disassembled for cleaning

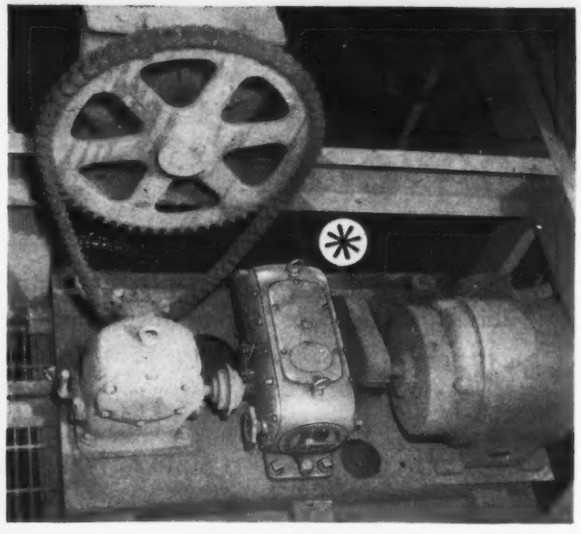
(Relief and back-pressure valves are manufactured by Milton Roy Company, Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. . . . or for more information check 2139 on form which is located opposite last page.)

"Of course it's real! I made it myself!"

Carbon black...

By means of a hand wheel on this Link-Belt P.I.V. Variable Speed Drive, speed of the driven screw conveyor can be changed at will to feed carbon black into pelletizing conveyor at optimum rate.





...to carbonyl

P.I.V. drives are particularly adaptable to delicate or sensitive manufacturing processes that require exacting variable speed transmission, like these high-pressure pumps circulating nickel carbonyl.

IT'S P.I.V. for exact regulation

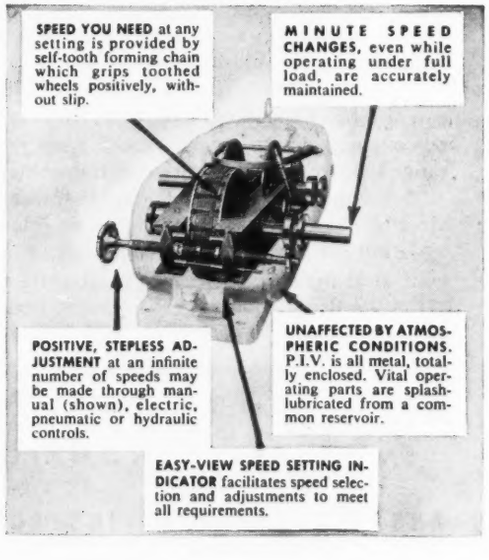
at an infinite number of variable speeds

Delivers required hp from maximum to minimum settings

SELECT your speed... set it... get it. Whether it's maximum or minimum, under full or light load, Link-Belt P.I.V. gives you positive, stepless changing — infinitely selective, effortless, precise.

There's no dependence on friction here. Instead, self-tooth-forming chain meshes with grooved wheels, delivering required speeds constantly, dependably.

Versatile P.I.V. drives are made in 8 sizes, 16 types, from ½ to 25 hp. Let your nearest Link-Belt office or authorized stock-carrying distributor know your needs or send for 88-page Data Book 2274.


SPEED YOU NEED at any setting is provided by self-tooth forming chain which grips toothed wheels positively, without slip.
MINUTE SPEED CHANGES, even while operating under full load, are accurately maintained.
POSITIVE, STEPLESS ADJUSTMENT at an infinite number of speeds may be made through manual (shown), electric, pneumatic or hydraulic controls.
UNAFFECTED BY ATMOSPHERIC CONDITIONS. P.I.V. is all metal, totally enclosed. Vital operating parts are splash-lubricated from a common reservoir.
EASY-VIEW SPEED SETTING INDICATOR facilitates speed selection and adjustments to meet all requirements.

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,977

When inquiring check 2140 opposite last page

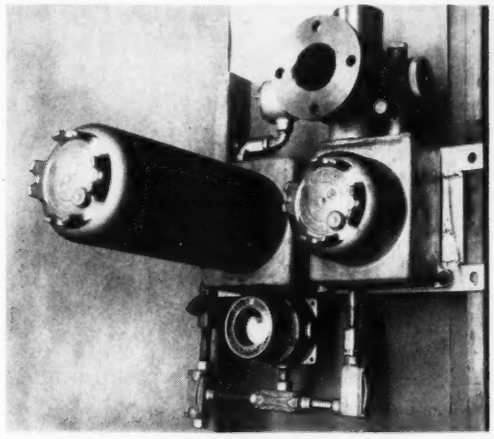
Provides monitoring of turbidity

Unit may be coupled to side stream, used directly in streams up to 3-inch diameter

Uses: Continuous monitoring of turbidity in fluids in water treatment plants, breweries, refineries, and wherever clarity of liquid products is a factor.

Features: Continuous turbidity monitor records suspended particle content directly in parts per million or less. When turbidity exceeds a preset limit, an alarm is sounded.

Description: Instrument is based on a dual beam null balance system. Light transmitted by the fluid is continuously compared to light scattered by suspended particles. Servo system maintains optical balance and eliminates drift and error due to lamp aging, line voltage variations, deposits on windows, temperature changes, gain instability, and so forth.



Turbidity monitor continuously determines clarity of liquid products

Turbidity monitor consists of two units: Detector unit and power unit. Detector unit is housed in an explosion-proof, dust-tight fitting. Its cell may be made of Monel, stainless steel, aluminum, and others, adaptable to pipe sizes to three inches and pressures to 500 psi. Power unit may be in an explosion-proof fitting or a chassis in cabinet or rack mount. It may be mounted at a distance remote from detector unit.

Specifications of instrument include range of 250 ppm, sensitivity of 0.05 ppm, linear or logarithmic scale, 0-50 mv for recorder, and 75°C maximum ambient temperature.

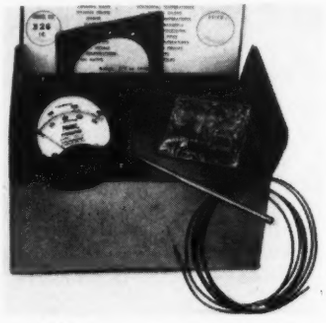
(Turbistat is product of Kaye Development Company, Subsidiary of Baird Associates-Atomic Instrument Company, Dept. CP, 33 University Rd., Cambridge 38, Mass. Check 2141 opp. last page.)

Make your own pyrometer to suit conditions on job

Uses: As "do it yourself" kit for making and installing a pyrometer on the job to suit conditions.

Features: Low-cost pyrometer kit furnishes all parts and components necessary to make a complete pyrometer. No special tools are required.

Description: Kit includes a calibrated meter, six feet of thermocouple wire, a Monel metal



"Make-your-own" pyrometer kit for use in non-corrosive liquids and atmospheres

tubular thermocouple well, a meter mounting bracket with all necessary screws and nuts for its assembly, together with complete step-by-step instructions.

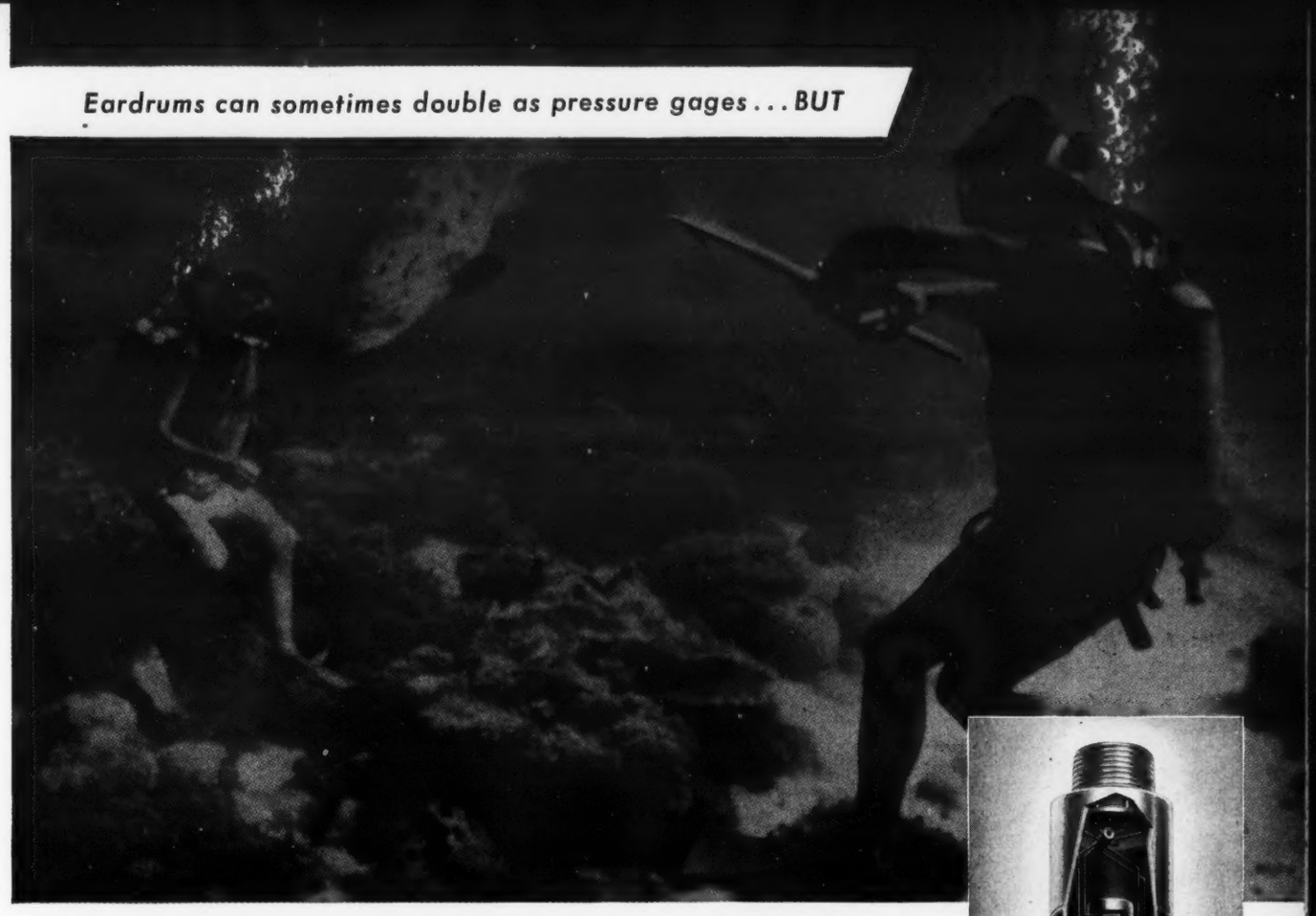
D'Arsonval meter movement has 2½" length scale and adjustment screw for cold junction setting.

Two models are offered; one with a thermocouple of chromel-alumel for range from 0° to 2300°F; another with an iron-constantan thermocouple for range from 0° to 1600°F. Pyrometer is for use in non-corrosive liquids and atmospheres.

(Models 326-IC and 326-CA are products of Pacific Transducer Corp., Dept. CP, 11836 W. Pico Boulevard, Los Angeles 64, Calif. Check 2142 opposite last page.)

For more information on product at right, specify 2143 . . . see information request blank opposite last page.

Eardrums can sometimes double as pressure gages . . . BUT



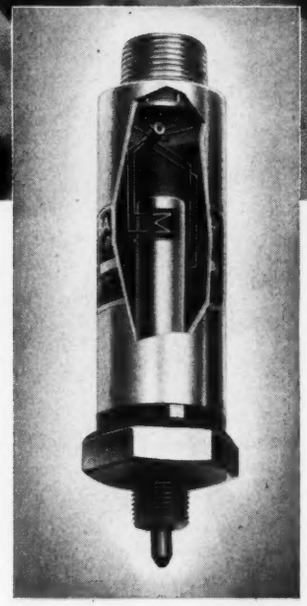
Use SR-4® Fluid Pressure Cells to measure and control all industrial pressures . . . safe, rugged, accurate to ± ¼%

The skin diver's eardrums are a kind of "go no-go" gage that tells him when he's down as far as he can go. But popping eardrums aren't recommended for performing accurate industrial pressure measurements!

SR-4 Fluid Pressure Cells will measure absolute or differential pressures consistently to less than ± ¼% accuracy! Using well-known SR-4 Bonded Wire Strain Gages, these transducers convert pressure changes directly into a varying electrical signal. This signal can be fed to Baldwin indicators, recorders, controllers or other instruments in a system. There are no moving parts to wear out, no long pressure lines with possible leakage and fire hazards. Remember, a system is only as accurate as its transducer.

If you have pressure measurement problems, a B-L-H representative will be happy to help you—in selecting the proper transducer or in engineering a complete pressure measuring system.

Write today to Dept. A for your free copy of Bulletin 4306, showing the wide range of SR-4 Fluid Pressure Cells.



SR-4 Fluid Pressure Cells are made in standard units with capacities as low as 15 psi and as high as 50,000. With pressure converted to proportional electrical voltage, the instruments for reading changes may be located at any remote point.

BALDWIN · LIMA · HAMILTON

Electronics & Instrumentation Division

Waltham, Mass.

SR-4® strain gages • Transducers • Testing machines

Ouija boards are passé

Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course . . . but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA* CHEMICAL PROCESSING has taken an important step toward sound and accurate planning in your behalf. It means that we are checking, double-checking and constantly rechecking —

- **Who you are**
- **Where you work**
- **What your job is**

The Publisher wants and needs this information — and the BPA* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- **Editorials that will *help you in your work***
- **Advertising that will *have value to you***

He can serve you even better if you will complete surveys and questionnaires which he may send you, and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of CHEMICAL PROCESSING is audited by . . .

***BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.**
420 Lexington Avenue New York 17, N. Y.

BPA

A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications

Offers galvanometer amplifier

Bulletin of four pages describes and illustrates zero-drift galvanometer amplifier for use in measuring low dc currents and voltages. Feature is continuously variable sensitivity giving full 5-milliampere output for any input from 5 to 50 millivolts. Theory of operation and size data complete description.

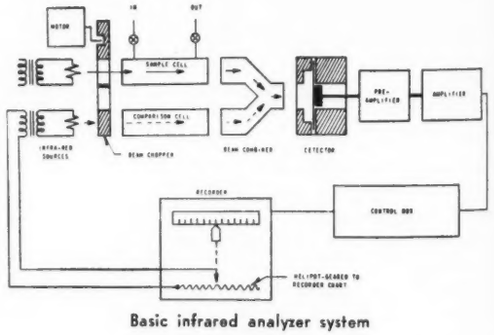
Bul CH374 is issued by Jarrell-Ash Co., Dept. CP, 26 Farwell St., Newtonville 60, Mass. When inquiring specify 2145 on form located opposite last page.

Quickly analyzes single component in complex mixture of gases or liquids . . .

analyzer can control either batch or continuous processes; has good accuracy and response

Uses: Electronic infrared analyzer can be used to detect any variation in composition of flowing liquid or gas to "trigger" automatic corrections where necessary. Can be used in petrochemical, chemical, petroleum, and other processes, as well as in industrial hygiene for air pollution problems.

Features: Infrared analyzer can make a quick and accurate analysis of a single component in a simple or complex mixture of gases or liquids. Analyzer is less expensive model of previously-developed more complex instrument.



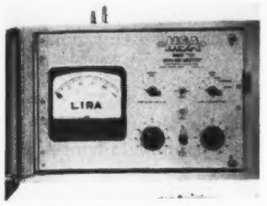
Basic infrared analyzer system

Description: Analyzer is completely automatic and continuous in operation. Two similar Nichrome filaments are used for sources of infrared radiation. Beams travel through parallel stainless steel cells. One beam traverses sample cell and the other the comparison cell.

As the gas in the detector absorbs radiation, its temperature and pressure increase and cause a condenser microphone membrane to move. The output signal is produced by conversion and electrical amplification of membrane movement. Output

signal is proportional to difference between the two radiation beams and is fed to recorder or indicating meter.

Instrument has a five position sensitivity test switch to allow checking without exposing chassis. Five-position voltage test switch allows spot checking of B-plus, oscillator and plate voltages of first amplifier, as well as infrared source and cathode voltages of amplifier's output tube. Both the sensitivity and voltage test switches facilitate fast, easy "trouble shooting".



Test switches on panel allow fast "trouble shooting" of infrared analyzer

Accuracy is one percent of full scale. Speed of response is 5 to 30 seconds for full scale. Instrument can be calibrated over very small (0 to 2 ppm or less) or very wide (0 to 100% gas) ranges.

(Model 200 infrared analyzer is product of Mine Safety Appliances Company, Dept, CP, 201 N. Braddock Ave., Pittsburgh 8, Pa. . . . or for more information check 2146 on form which is located opposite last page.)

Provides list of check points for ordering pressure gages

Selection of test gages for fluid-pressure measurement, from 30" Hg vacuum to 20,000 psi, is covered in eight-page catalog. Dial sizes, pressure ranges, and types of connection are specified for all models of gages shown. List of check points serves as guide for proper selection.

Cat 400 is issued by United States Gauge, Division of American Machine and Metals, Inc., Dept. CP, Sellersville, Pa. When inquiring specify 2147 on form opposite last page.

Why no subscription price for this magazine?

You might think it odd that you get CHEMICAL PROCESSING without demand of a formal subscription charge. But it really isn't so strange!

See page 79.

how big can a small valve be?

Take this Hoke needle valve for instance...It looks pretty small on the front panel of Perkin-Elmer's new vapor fractometer, but it looks *big* in the eyes of the man who's buying or making equipment like this. Just a handful of brass? That's so, but carefully fashioned to control up to 3000 psi with no strain! It's added evidence of careful engineering.

Whether you're the man who makes high quality test equipment or the man who uses it, we'd like to prove to you how *big* Hoke valves can be. There are valves in the Hoke line for hydraulic and pneumatic equipment; for instrument panel or test stand use; for pilot plants . . . Forged needle valves (like the one shown), bar stock valves, packless valves and toggle valves. May we send you a catalog?

HOKE, INCORPORATED, FLUID CONTROL SPECIALISTS, 145 S. DEAN ST., ENGLEWOOD, N. J.

HOKE

When inquiring check 2148 opposite last page

THE VALVE THAT LIKES TO BE COMPARED

K&M design features and production standards prove out...

Kieley & Mueller always invites comparison . . . because comparison alone points up the superior value of K&M Diaphragm Control Valves.

First, *compare response* of the K&M fully molded diaphragm combined with the highest power factor in the industry. *Compare the safety* and convenience of the all steel topworks. And, *compare materials*, part for part . . . K&M furnishes—as standard without extra cost—more parts manufactured of high-finish costly alloys.

Then, compare K&M valves in service . . . *side by side* with any other diaphragm control valve.

Keep your own maintenance records . . . and your own records will tell the K&M story.

Send for your copy of the K&M Valve Data Catalog, Bulletin CV-53.

78th Anniversary... Oldest U.S. Pressure and Level Control Valve Manufacturer

diaphragm control valves

KIELEY & MUELLER, INC.
64 Genung Street • Middletown, New York

K&M

When inquiring check 2149 opposite last page

All dial markings are eliminated, except at calibrated point, to prevent confusion . . .

thermometer is calibrated at one point for high accuracy of reading

Uses: As custom calibrated dial thermometer with high accuracy at one specified temperature point.

Features: All dial markings are eliminated, except at calibrated point, to eliminate confusion in reading.

Description: Instrument is bi-metallic thermometer which can be calibrated at any single desired point between −40° and 1000°F or between −10° to plus 300°C. Dial housing measures 1-11/16". Actual dial diameter is 1-7/16". Models are available with plain bushing or ½, ¼, ⅜" NPT, and ⅜-24 x ½" NF thread mounting nuts. Stem lengths from as short as 2½ to 70" long can be furnished. Crystal is curved. All parts, with exception of dial, are made from type 304 stainless steel.

Dials are finished in black with white figures

Dials are finished in satin black with white figures and red-filled reference mark.

(Custom calibrated thermometer is product of W. C. Dillon & Company, Inc., Dept. CP, 14620 Keswick Street, Van Nuys, California . . . or for more information check 2150 on form opp. last page.)

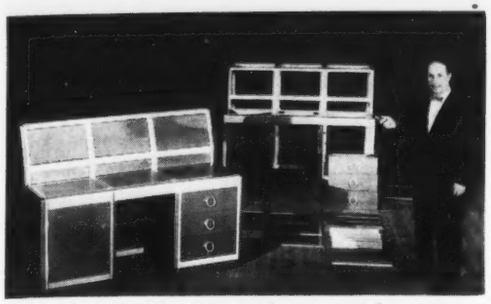
'Building block' metal enclosures for instrument housing . . .

'do-it-yourself' approach to large number of cabinets for controls and instruments

Uses: As "building block" metal cabinet enclosures to house instrumentation, automation, electronic, and electro-mechanical equipment.

Features: Large number of cabinets can be developed using 75 standard "building block" modular enclosures and 125 sub-parts. "Do-it-yourself" approach is possible as modular units are factory sub-assembled.

Description: Finished cabinets and enclosures



Modular units taken from stock were used for master control console

can be constructed by bolting together different tops, backs, sides, and fronts to basic modular steel framework skeletons. Panel mounting holes are punched in skeleton frames so entire interior of frames is ready to take many varieties of "skins". Forty different panels, four different size drawers — from 7 to 14 inches high — are some of component parts. Writing desk tops, sloping front consoles, extended arm rests, turret panels are among sub-parts that can be furnished directly from stock by manufacturer.

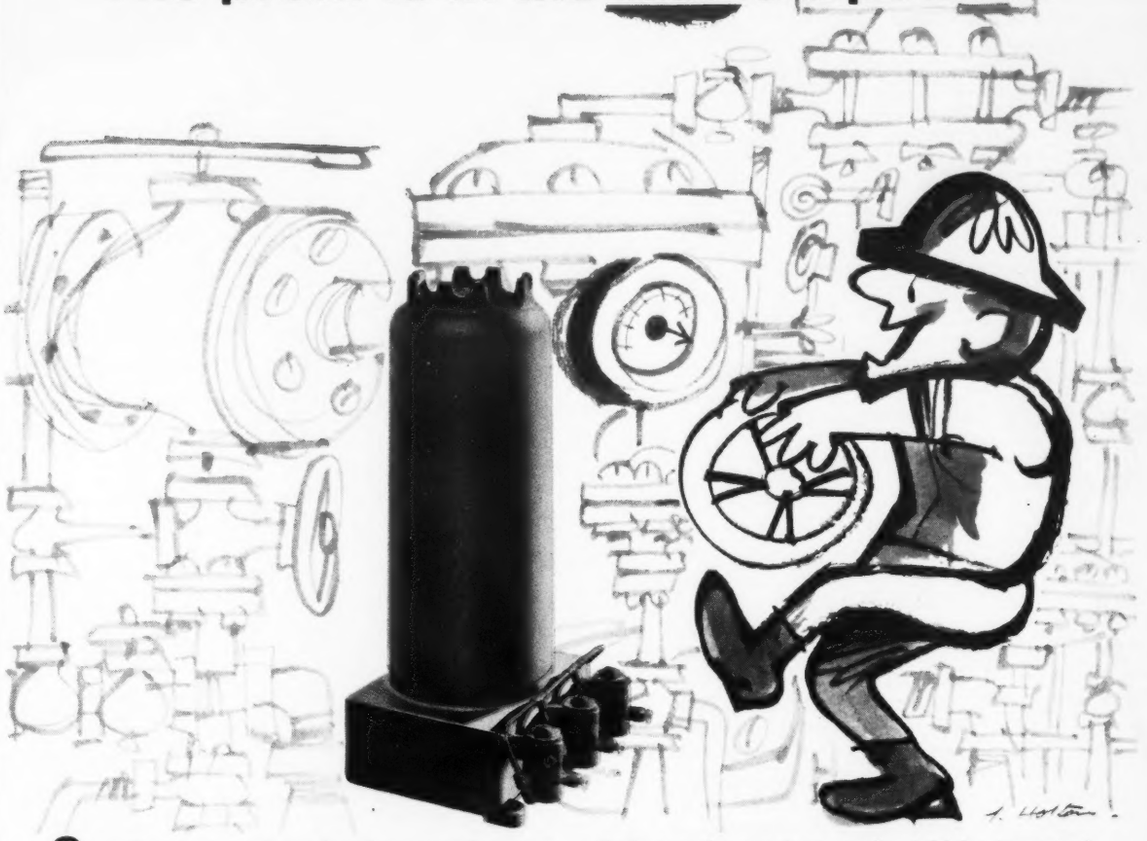
(Building block cabinets are product of Elgin Metalformers Corporation, Dept. CP, 630 Congdon Ave., Elgin, Illinois. . . . or for more information check 2151 on form opposite last page.)

". . . but you said to pack the pump!"

Idea originated by J. S. Beecher, Power Chemicals Division, E. F. Drew & Co., Inc., New York City.

Continuous stream analysis . . . for optimum process yields.

The profit is in the last few pounds

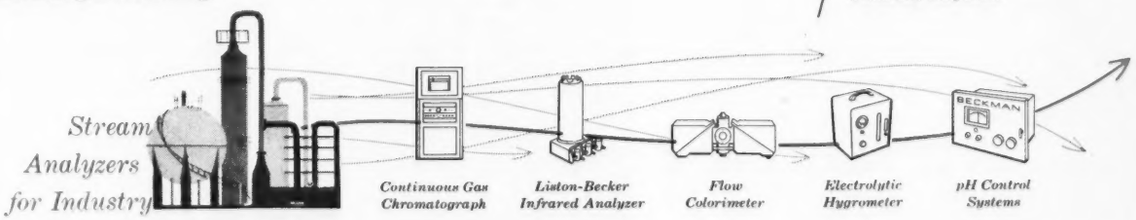


Operating costs and overhead account for most of the pounds, gallons or tons of production. The profit is in the last few percentage points of yield. Only by running the equipment right up to the limit can the precious profit yield be increased. Beckman Infrared Gas Analyzers provide the operator with the continuous, precise process information required for the extra pounds that count.

The Beckman Model 21 Infrared Gas Analyzer is a rugged industrial instrument for the monitoring of plant streams, liquid or gas. It is a positive, non-dispersive instrument of service-proved superiority in reliability and accuracy. It can be coupled with a standard recorder or with a recorder-controller for automatic process control. Commercial applications include continuous analysis for the purity of ethylene (90-100% range) and butadiene (95-100% range); the measurement of methane and ethane in ethylene; CO and CO_2 in hydrocarbon streams and ammonia synthesis gas; unreacted CH_4 in natural gas reforming.

Sensitivity of the Model 21 is 0.1 ppm; accuracy, ±1% of scale. Maximum sensitivity drift is 1% of full scale in 24 hours; maximum zero drift, 1% of full scale in 8 hours. The analyzer unit, in explosion-proof housing, can be mounted vertically or horizontally, convenient to the stream – up to 600 feet from the control panel-amplifier. For full details, write for Data File P-4-11.

Beckman® / *Process Instruments*
Beckman Instruments, Inc.
Fullerton, California



When inquiring check 2152 opposite last page

Proportions with high accuracy can be used in horizontal or vertical position . . .

"thermal isolator" section keeps pilot valve cool; control differential quickly adjusted

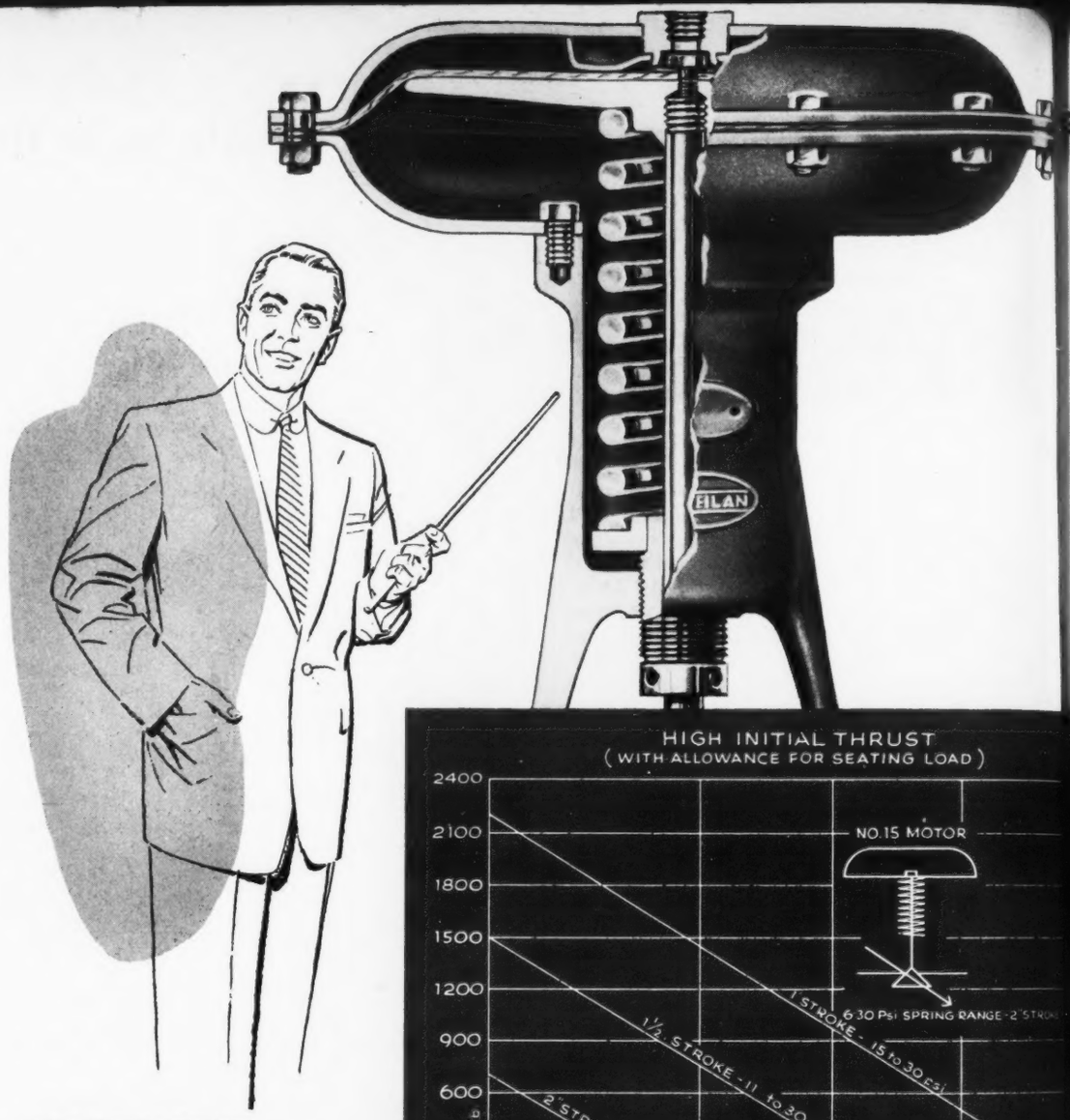
Uses: Provides accurate and flexible temperature regulation of liquids or air when used in conjunction with valves, dampers, or other controls.

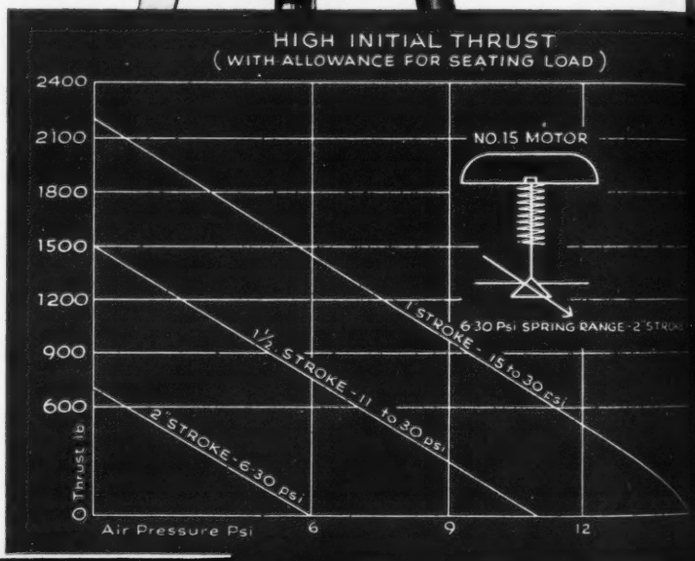
Features: Controller may be installed in horizontal or vertical position. "Thermal isolator" section keeps pilot valve cool. Effective control differential of device may be quickly adjusted in field, with screw driver, to any spread between 5 and 25°F.

Proportional band can be field-adjusted with screw driver

Description: Pilot type thermostatic controller is available in any 200°F range from 50 to 600°F. Recommended where compressed air is used as pilot supply, controller measures 3-13/16" wide and 19¾" long. Pilots are modulating in action. Operation of final control device governs amount of either cooling or heating applied to medium under control. Pilot valve action can be reversed in field with ordinary tools in about 30 minutes. This includes time for checking calibration of instrument.

(FulTrol Model 1100 C, D high-temperature controller is product of Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Dept. CP, PO Box 400, Knoxville, Tenn. . . . or for more information check 2153 on form which is located opposite last page.)





HIGH INITIAL THRUST:

Example — No. 15 Motor with 2" Rated Stroke and 6-30 psi Spring used on Valves with 2" and 1" Strokes.

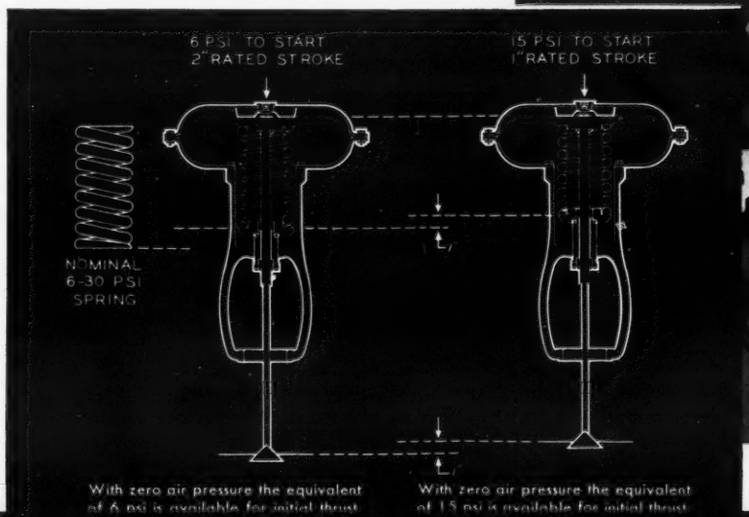
Proportions with high accuracy and easy adjustment of capacity . . .

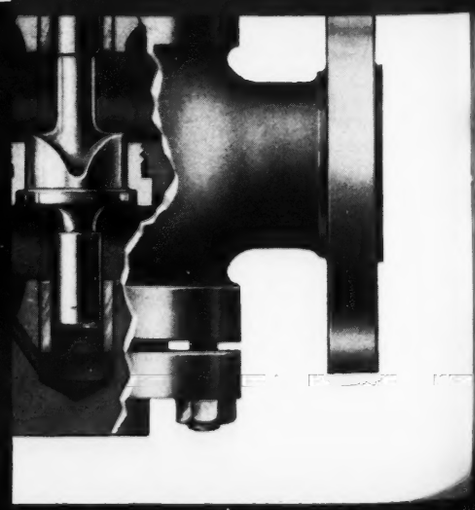
plug-in reagent end, standardized components permit ready accessibility

Uses: As proportioning pump adaptable to wide range of chemical feeding applications.

Features: Proportioning pump has "plug-in" liquid ends, plungers, motors, other mechanical components which permit ready accessibility and servicing. Volumetric accuracy is within ±1%. Capacity is easily adjusted.

Description: Proportioning pump is available in either simplex or duplex styles. Unit includes


6 PSI TO START
2" RATED STROKE
15 PSI TO START
1" RATED STROKE
NOMINAL
6-30 PSI
SPRING
With zero air pressure the equivalent of 6 psi is available for initial thrust
With zero air pressure the equivalent of 15 psi is available for initial thrust



In Single Seated Control Valves

Get AMPLE POWER plus SIMPLICITY, ECONOMY, SAFETY

with Masoneilan Spring-diaphragm Motors

You get the best combination of safety (action on air failure) with maximum potential thrust, plus inherent simplicity and reliability in Masoneilan Spring-diaphragm Motors for single seated control valves.

Many single seated valves are specified to close on air failure. Hence the initial spring compression must provide the force for closing, since the valve would normally be installed with flow tending to open. Thus, to overcome unusual off-balance forces, a high *initial* thrust must be developed.

On air-to-close valves, the motor should develop a high net thrust at the *end* of the stroke. Thus, to overcome unusual off-balance forces a high *final* thrust is essential.

The design of Masoneilan motors enables you to obtain high *initial* thrust or high *final* thrust or, in the case of three-way valves, *both* high initial and final thrust, using, in most cases, standard springs.

Here's how —

HIGH INITIAL THRUST: Usually an oversize motor is used with a standard spring, but with the difference in stroke used to gain more initial compression and consequent additional spring force.

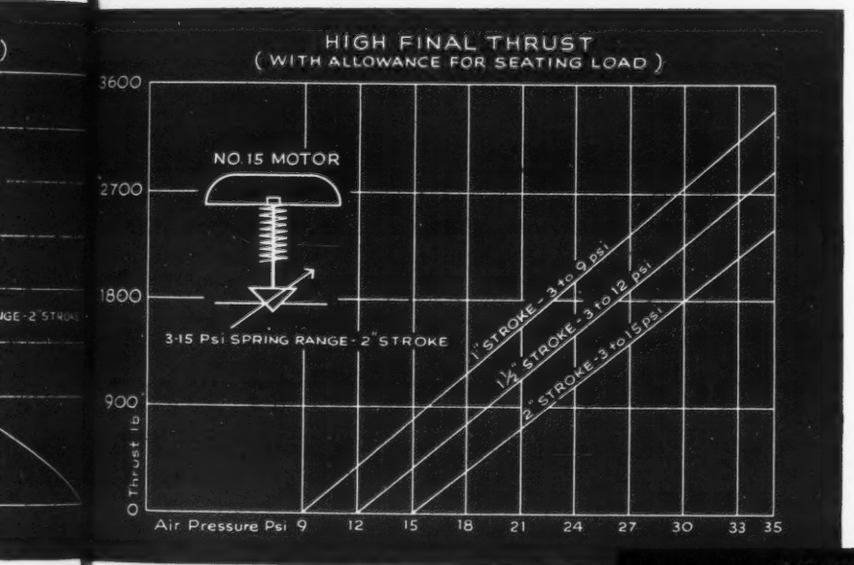
HIGH FINAL THRUST: The normal size motor often is used by simply increasing the air supply pressure to 30 or 35 psi. If necessary an oversize motor can be used to obtain even greater final net thrust.

HIGH INITIAL AND FINAL THRUST: Using an oversize motor permits adjusting the spring setting to obtain high initial thrust and makes an excess of supply pressure available for high final thrust.

Example — No. 18 Motor with 3½" Rated Stroke and 6-30 psi Spring used on Valve with 2" Stroke.

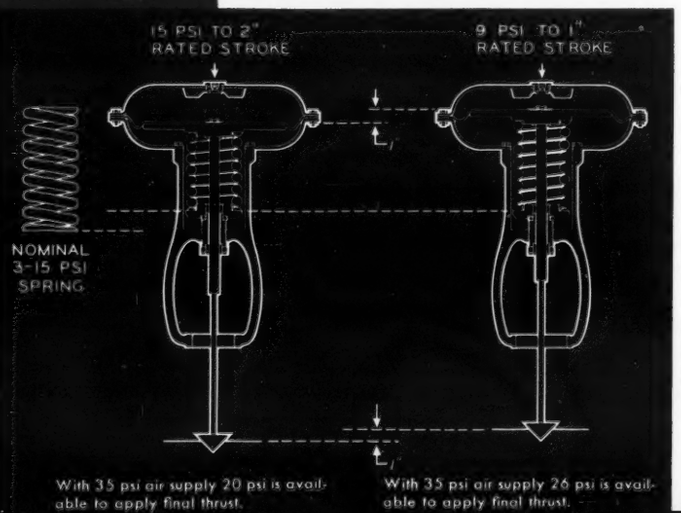
The spring can be set for 8-22 psi nominal range, giving an initial diaphragm load of 8 psi and (with 30 psi supply) 8 psi is also available for final thrust.

Tabulated data are available for facilitating correct control valve selection. Ask our nearest office for Data Sheet 10-11 — or write Mason-Neilan, Division of Worthington Corp., 51 Nahatan St., Norwood, Massachusetts.


HIGH FINAL THRUST
(WITH ALLOWANCE FOR SEATING LOAD)
3600
2700
1800
900
0
O Thrust lb
NO.15 MOTOR
3-15 Psi SPRING RANGE - 2" STROKE
1" STROKE - 3 to 9 psi
1½" STROKE - 3 to 12 psi
2" STROKE - 3 to 15 psi
Air Pressure Psi 9 12 15 18 21 24 27 30 33 35

HIGH FINAL THRUST:

Example — No. 15 Motor with 2" Rated Stroke and 3-15 psi Spring used on Valves with 2" and 1" Strokes.


15 PSI TO 2" RATED STROKE
9 PSI TO 1" RATED STROKE
NOMINAL 3-15 PSI SPRING
With 35 psi air supply 20 psi is available to apply final thrust.
With 35 psi air supply 26 psi is available to apply final thrust.

MASON-NEILAN

Division of Worthington Corporation

25 Nahatan Street, Norwood, Massachusetts

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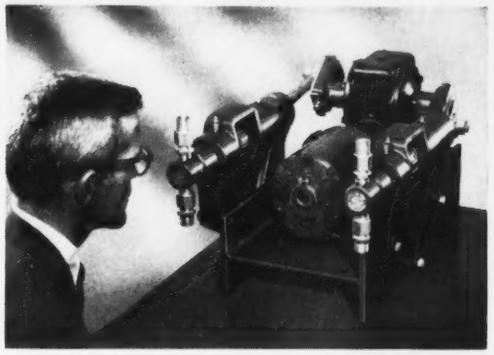
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto



Proportioning pump includes full-size reduction gear, pump frame, and motor on structural steel base plate

full-size reduction gear, with pump frame and motor arranged on structural steel baseplate. Check valves are self-purging straight-through design with sharp, positive cut-off through double-ball action on suction and discharge. Desired pump capacity is set by positioning crank pin with micrometer screw adjustment. Standard liquid ends are either steel or iron with stainless steel trim, or all stainless steel.

(Model 1140 Proportioneer is product of Proportioneers, Inc., division of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence 1, Rhode Island . . . or for more information check 2154 on the convenient Reader Service slip which is located opposite last page.)

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Would you like to receive your own copy regularly . . . for greater convenience in reading?

If you are responsible for processing operations in an administrative, production management, engineering or technical function, it may be possible to send you copies of CHEMICAL PROCESSING regularly, without charge.

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For more information on product at left, specify 2155 . . . see information request blank opposite last page.

ARROW
AUTOPNEUMATIC CONTROL

The one top quality assembly that performs the complete job for thorough conditioning and control of compressed air used to power all types of pneumatic tools and appliances.

The AUTOPNEUMATIC CONTROL ASSEMBLY features . . .

. . . The ARROW FILTER
high flow capacity with filtration as required and low pressure drop.

. . . The ARROW REGULATOR
high flow capacity with positive pressure control.

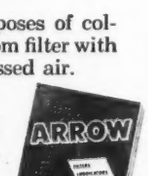
. . . The ARROW LUBRICATOR
high flow capacity with correct oil mist lubrication.

. . . The ARROW AQUAMATIC DRAIN TRAP
automatically disposes of collected moisture from filter with no loss of compressed air.

Assemblies and separate units supplied in pipe line sizes from ¼" NPT through 2" NPT.

QUALITY PRODUCTS SINCE 1914

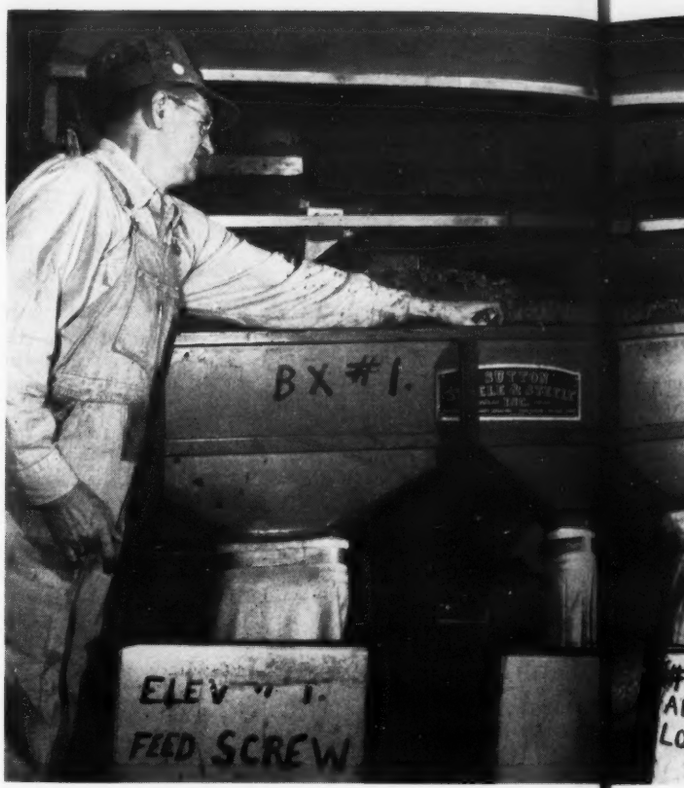
Catalog and engineering data on request.



ARROW TOOLS, INC.
1904 S. KOSTNER AVE. • CHICAGO 23, ILL.

When inquiring check 2157 opposite last page

ideas — from other industries and nuclear field . . . new trends in research, processes, services

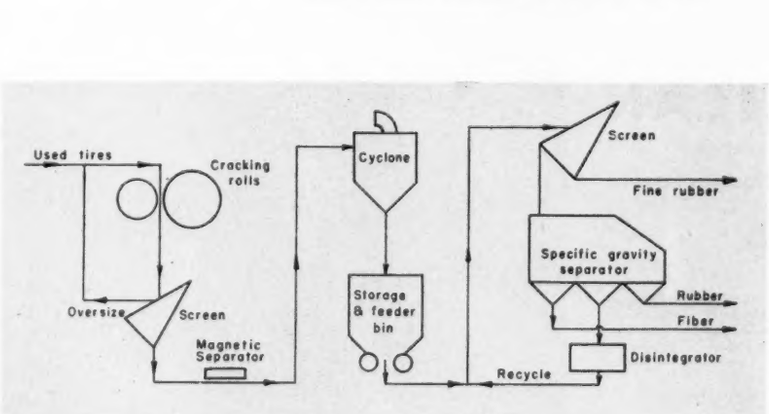


Gravity separator divides material stream into three portions: rubber on right; fiber on left; and combined fiber and rubber, for recycling, in center of separator

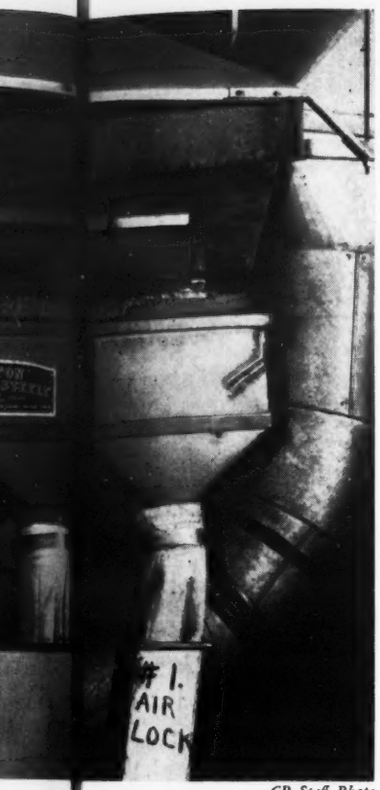
In reclaiming rubber from used tires, cord fiber must be completely removed. In "dry" process, specific gravity unit assures high-quality product in critical operation as it —

efficiently separates fiber fro

THEODORE W. WETT, Assistant Editor
With **MR. D. V. TOPPER,** Plant Superintendent
Midwest Rubber Reclaiming Co., East St. Louis, Ill.



Flow diagram for "dry" process for rubber reclaiming. Gravity separator performs critical fiber-rubber separation



CP Staff Photo

ber from rubber

SPECIFIC gravity separators make critical rubber from fiber separation essential to "dry" process for reclaiming rubber at Midwest Rubber Reclaiming Co. In dry process, unlike processes involving acid or alkali, fiber can be recovered for sale and no rubber fines are lost because no washing is necessary. Rubber can be ground to any desired degree of fineness to assure better devulcanization and a more uniform product. Since cellulose is a deleterious and objectionable impurity in rubber, dry process depends on achieving a complete separation of tire cord fiber from rubber particles.

Process proceeds as follows: Tires are received by train or truck and passed through cracking mills where initial breakdown occurs. Discharge from cracking rolls is screened. Particles over one inch and major portion of wire bead are re-

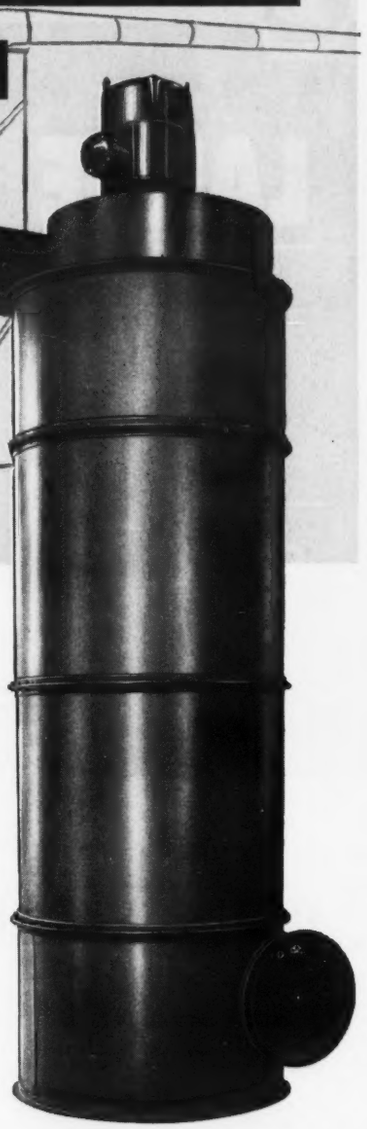
(*Please turn to page* 78)

THE FIRST COMPLETE PACKAGE-TYPE FUME WASHER

IN STANDARD SIZES . . . AT LOWER COST!

The Cyclonaire

•only a fraction the size of custom built units of comparable capacity



The new Cyclonaire, though only a fraction of the size, offers more fume removal capacity per dollar of cost than any custom-built unit of comparable capacity. The first complete "packaged" fume washer, it is made in four standard models with capacities ranging from 750 c.f.m. to 6,500 c.f.m. (Larger sizes on special order.) Outside dimensions range from 20″ o.d. x 8′9″ high to 48″ o.d. x 14′7″ high. Power requirements are low, and the compact design permits placing it almost anywhere in the plant. It will handle most corrosive gases normally encountered in fume scrubbing operations, with removal of many gases (of 1% concentration or less) up to 99.9% effective.

In operation the Cyclonaire is a wet bed scrubber . . . and the secret of its high efficiency is the bed of Intalox Saddles with which it is packed. Intalox Saddles provide greater randomness of packing and more contact surface area to water and fumes — hence more thorough scrubbing action — than any other industrial tower packing, volume for volume.

The Cyclonaire is constructed of steel in flanged sections which are easily assembled in a few hours — or disassembled and relocated in a comparably short time. Inner surfaces are protected from corrosion by a 3/32″ thick Tygon sheet lining. Outer surfaces are protected with Tygon "ATD" Hot Spray Corrosion-Resistant Paint.

■ *If you have a fume, dust or mist problem it will pay you well to . . . Take a look at the data . . .*

252-E

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE

AKRON 9, OHIO

Send for Bulletin FW-4. Get the complete story on this more efficient yet less expensive, space saving method of fume elimination.

When inquiring check 2158 opposite last page

Hand-tailored to any size you need...

...Goetze Heat Exchanger Gaskets are precision-made for longer service

Whether your requirements call for heat exchanger gaskets larger than 100" in diameter, or smaller than 10", you can get the exact size you want . . . hand-tailored to the shape you need . . . simply by specifying "Johns-Manville Goetze."

And because they're *precision-made*, you'll find these better gaskets provide the effective sealing and longer life that make them actually cost less in the long run. Each gasket is carefully constructed in every detail to assure accuracy of fit . . . to provide ample lap widths and uniform rib widths . . . and to prevent trouble-making wrinkles or cracks on the corners.

If you're having trouble with persistent joint leakage and frequent gasket replacements, find out how little it costs to have Goetze Heat Exchanger Gaskets tailored to your requirements. Your blueprint or template will bring a prompt estimate. Address Johns-Manville, Box New York 16, New York.

Johns-Manville Goetze GASKETS

THERE'S A JOHNS-MANVILLE PACKING AND GASKET FOR EVERY SERVICE

When inquiring check 2159 opposite last page

Gravity Separators

(*Continued from page 77*)

moved. Bead is discarded and oversize particles returned to cracking rolls. Particles less than one inch in size are passed over magnetic separators to remove remaining bead and into a cyclone separator where dust and some fiber are removed. Discharge from cyclone goes into a storage and feeder bin, installed to smooth material flow onto gravity separator tables.

Tables separate stream into three portions: free rubber, which is sent to granulators and devulcanization process; combined fiber and rubber, which is passed through a disintegrator to further remove rubber from fiber and recirculated; fiber, which then goes to fiber cleaning and dressing operation.

Specific gravity separator has a vibrating porous deck situated with a slight incline. A controlled volume of air is delivered up through this deck. Material is fed to deck at one corner and rising air stratifies it according to weight. Heavy particles contact vibrating deck which conveys them to high edge. Lighter particles, suspended by air stream, flow by gravity across deck to lower edge. Intermediate weight particles contact deck surface only occasionally and discharge at an intermediate point.

Gravity separation units were chosen by actual laboratory testing of various methods of separation, and previous experience with similar equipment. They were installed in 1952. Two separators are used, each with a capacity of 4000 to 5000 lb/hr. Dynamic counterbalances reduce vibration and shock. Maintenance has been moderate and management and operating personnel are well satisfied with units' performance.

(BXM-200 gravity separators are a product of Sutton, Steele & Steele, Inc., Dept. CP, Dallas, Texas. Check 2160 on form opposite last page.)

Discusses nuclear engineering services and facilities

Nuclear measurements, analyses, testing, consulting, design, research and development services are discussed in 24-page brochure. Illustrations show laboratory equipment and facilities for various services offered. Reproduction of four-color painting on cover showing Admiral Nelson's flagship alongside the atomic powered submarine Nautilus symbolizes the progress science has made during the intervening period.

Engineering services brochure is issued by Nuclear Science and Engineering Corp., Dept. CP, PO Box 10901, Pittsburgh 36, Pa. Check 2161 on form opposite last page.

What's so strange . . .

. . . about our willingness to send you this magazine without demand of a token subscription fee?

Nothing, really.

You see, no publisher of industrial magazines breaks even on subscription revenue . . . not after he's paid out the costs of getting that revenue.

Why, then, are there any "paid" magazines . . . those which charge a subscription fee?

The answer: The "paid" designation permits mailing the magazine at cheaper second class rates than is possible for "controlled circulation" magazines such as CHEMICAL PROCESSING. It all stems back to an old postal regulation that has long outlived its usefulness.

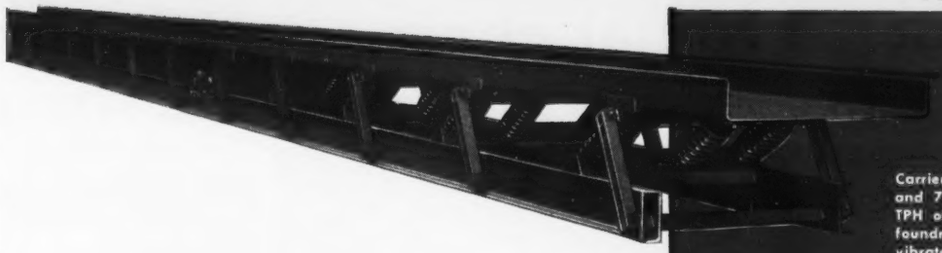
We *prefer* to handpick the men who will receive CHEMICAL PROCESSING magazine, on the basis of continuing research that tells us who are the important men that work in the field our editors and advertisers serve. By selective handpicking, rather than by extracting a "token" subscription fee from anyone susceptible to a subscription pitch, we can be *sure* that we reach the men who matter most in managing chemical processing operations.

Is that so strange?

THE EDITORS
OF CHEMICAL PROCESSING

P.S. Many "paid" magazines have substantial "controlled" circulation . . . up to 30 percent is permitted by postal regulation. And many publishers of "paid" magazines have "controlled" magazines in their stable, too.

That is strange!



PROCESS WHILE YOU CONVEY WITH CARRIER ~~NATURAL-FREQUENCY~~ CONVEYORS!

Carrier Natural-Frequency Conveyors, Feeders, Shakeouts and other Vibrating Equipment have taken on some of the roughest, toughest products in America — are now conveying and processing them quickly and efficiently, *with an absolute minimum of maintenance and downtime!*

Carrier Natural-Frequency Vibrating Equipment works on a unique principle which substitutes the natural resonance action of rugged coil springs, for brute force. Where up to 90% of the power output of a "brute-force" conveyor may be required to operate its moving parts—and only about 10% to convey its load — substantially no more power is required to operate Carrier Natural-Frequency equipment empty, *than to run the motor alone!*

Whether you handle castings or crystals, sludge or sand, plastics or peanuts, it will pay you to get all the facts about Carrier Natural-Frequency Vibrating Equipment. Remember — Carrier developed the world's first really modern vibrating equipment . . . knows more about its *practical* industrial applications than anyone else. May we talk with you soon? Carrier Conveyor Corporation, 247 North Jackson Street, Louisville 2, Kentucky.

HIGH-TEMPERATURE, HEAVY-DUTY

Carrier Conveyor 3' wide and 70' long, handling 150 TPH of red hot castings and foundry sand. 50 coil springs vibrate approximately 3 tons of weight. One 10 HP drive.

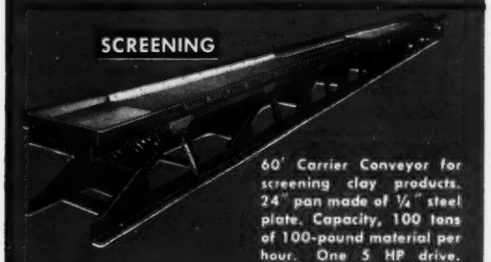
DRYING

Four 30' Carrier Conveyors for drying clay mix. Material is conveyed beneath bank of burners and is dried from 15% moisture to 9% or less. One 5 HP drive.

QUENCHING

18' Carrier Spiral Conveyor of stainless-steel construction, handling 1 TPH of hot pellets. Material is water-quenched—amount of quenching regulated by adjusting depth of water.

SCREENING



60' Carrier Conveyor for screening clay products. 24" pan made of ¼" steel plate. Capacity, 100 tons of 100-pound material per hour. One 5 HP drive.

LEACHING

50' Carrier Conveyor which washes, rinses and dries a sponge metal in one operation. Combination process saves time, space and manpower.

COOLING

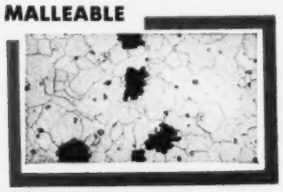
12' Carrier Conveyor conveys 800 PPH of dried milk solids, cooling from 180° F. to 100° F. Lower deck for spray nozzles, upper for conveyed materials.

When inquiring check 2162 opposite last page

Link-Belt Promal chain specified to resist heavy loads and abrasive wear

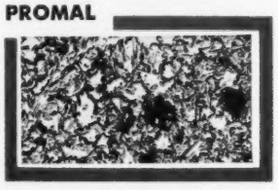
GREATER WEAR RESISTANCE of Link-Belt H-Class Promal Drag Chain has been proved in grueling conveying service under severely abrasive conditions. Promal's extra strength provides low-cost, long-life performance where ordinary chains fail.

MALLEABLE



MICROPHOTOS show difference between ordinary malleable iron and Promal. Left—white areas in malleable microphoto represent "free iron" . . . black shows soft nodules of carbon. Right—dark areas in Promal structure show stronger, stiffer reinforcing material which strengthens metal; resists distortion, wear.

PROMAL



Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads — and wear resistance supplies the durability to cope with severe abrasion.

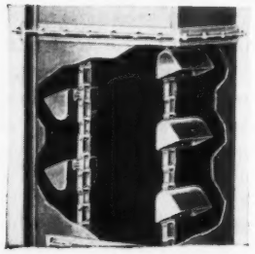
Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasive conditions.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.

How and where to apply Promal Chains in the Chemical Industries

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.



Class C combination chain is one of the most popular types for general purpose elevator and conveyor service. The cast center links and steel sidebar combination forms a strong, rugged yet inexpensive elevating medium. Attachments are available for both cast center links and the steel sidebars so that desired bucket spacing may be accommodated.

Ley bushed chain withstands grueling service conditions

Rugged, reinforced cast links with renewable, hardened steel bushings on Link-Belt Ley Bushed chains minimize abrasive wear. Shields on integral sidebars deflect dirt and abrasives from joints. Steel connecting pins are also shielded —and locked against rotation. Heels on inside of links provide wear-resistant sliding surfaces and guide the chain onto the sprocket.

HEADQUARTERS FOR CHAINS, SPROCKETS is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

LINK-BELT

THE SYMBOL OF QUALITY

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,282

When inquiring check 2163 opposite last page

Statistical quality control used to evaluate and improve pilot plant process

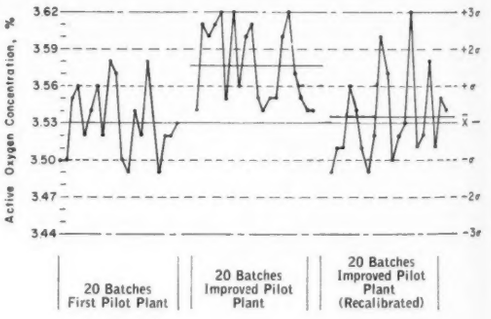
Control chart reveals capabilities of equipment in peroxygen chemical process

Although statistical quality control has gained a solid foothold in full-scale production, its basic concepts are often overlooked during the development phases of a process. A simple control chart can often be instrumental in setting specifications and revealing otherwise unnoticed information.

Take the case of a small pilot plant unit producing a peroxygen chemical containing about 3.5% active oxygen. Initial specification for product was "at least 3.4% active oxygen". Consumer was willing to increase purchases if specifications were 3.4 to 3.55%.

Examination of records, however, revealed that several lots were greater than 3.55%. It was suggested that a control chart be plotted to determine the capabilities of the pilot plant equipment used in the process. Twenty recent lots were used to establish control limits. The latter were

Control Chart For Pilot Plant Batches



found to be approximately 3.44% (lower) and 3.62% (upper) at the 3σ level (see chart). (Within $\pm 3\sigma$ limits, lie 99.7% of observational values).

The established limits, with an explanation as to their origin, were suggested to the customer as alternative specifications. Since his process conditions could apparently be set for product variation within these limits as easily as for variation within the original range, the statistical limits were accepted.

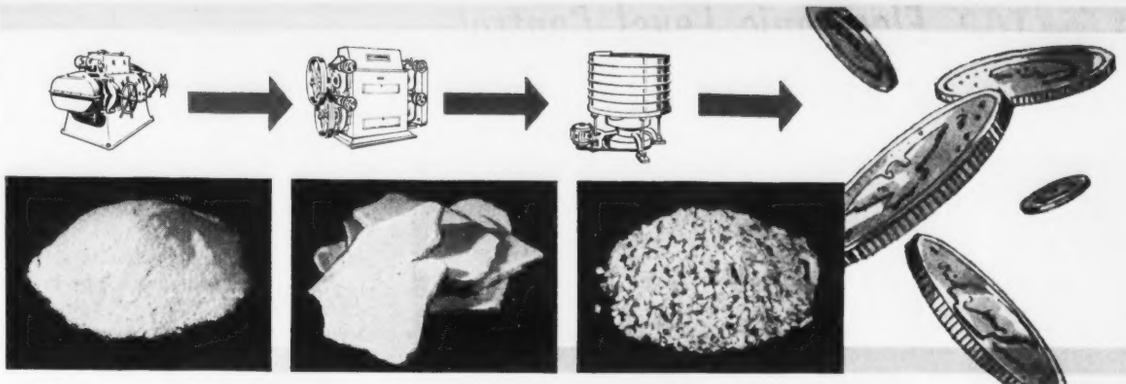
As a result of more orders, the pilot plant process was improved and expanded to take care of the increased production. After a short time's operation, it was noted that, while still "in control" the product tended to contain slightly higher con-

centrations of active oxygen (see chart). Obviously, the process had been affected in some way by the alterations (which consisted in moving equipment to a more convenient location and installing measuring tanks for metering requisite amounts of raw material—previously, the raw materials had been weighed for each batch produced).

Since the measuring tanks were the only new major pieces of equipment installed, it was decided to re-check their calibration. This proved to be the trouble. Recalibration resulted in lowering of the mean value to the old pilot plant level (see chart).

(Based on paper presented at Eleventh Midwest Conference on Quality Control, by F. R. Sheldon, Becco Chemical Division, Food Machinery and Chemical Corporation, Dept. CP, Buffalo, N.Y. The above excerpt is published with the permission of the American Society for Quality Control.)

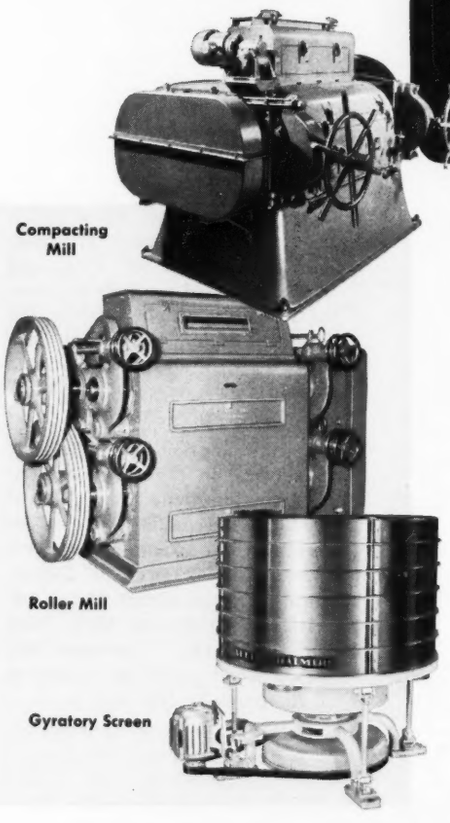
"HEY, SPIKE . . . C. J. here wants some paint for his patio . . . STRICTLY ON THE 'Q.T.!"



Converts WASTE into PROFIT

ALLIS-CHALMERS
Compacting Process

it's mechanical
it's economical



You start with a pile of practically worthless material and wind up with a profit! Magic? Well, hardly – unless you want to call the mechanical efficiency of the Allis-Chalmers Process System magic.

How It Works

In a recent installation the conversion starts with an unusable, unacceptable minus 30 mesh chemical salt . . . fines created in the original process. An Allis-Chalmers compacting mill densifies these fines into flakes or slabs. Flakes are granulated in an Allis-Chalmers roller mill. Final separation is made in an Allis-Chalmers stainless steel gyratory screen. Result – 70 to 80% recovery of salable product. What's more – the resulting granules equal or surpass the natural product in every respect.

The entire system is mechanical; therefore, it's more economical than controlled crystal growth.

For More Information

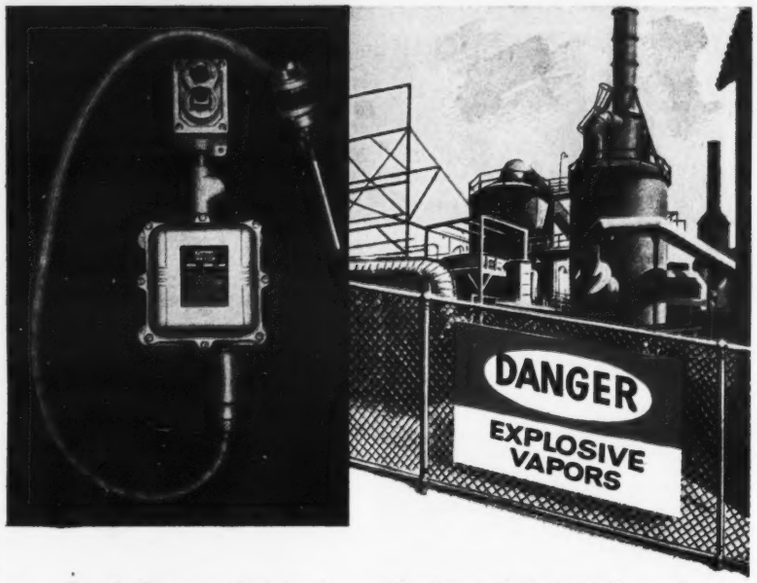
Get the complete story from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 25C6177J.

ALLIS-CHALMERS

A-5345

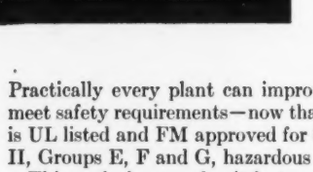
When inquiring check 2164 opposite last page

TEKTOR® Electronic Level Control safe for hazardous locations



Practically every plant can improve level control electronically—and meet safety requirements—now that the entire Fielden TEKTOR System is UL listed and FM approved for Class I, Groups C and D, and Class II, Groups E, F and G, hazardous locations.

This explosion-proof unit features a specially-designed ferralloy housing and Teflon* insulated probe. Available for fail-safe high or low level control, it features the same simple and versatile capacitance circuitry found in the standard TEKTOR unit.



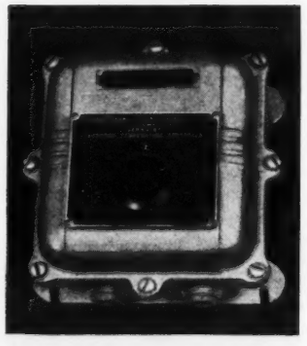
As level changes, capacitance at the probe also changes and energizes a relay. TEKTOR flashes a warning and can operate controls to keep level from exceeding desired limit.

*Trade-mark for Du Pont tetrafluoroethylene resin.

TEKTOR features

- Controls level of liquids, liquid interface, powders, granular solids (conducting or non-conducting)
- Responds to changes as small as 1/16" in aqueous solutions
- No moving parts—only one radio tube

NEW EXPLOSION-PROOF TEMPERATURE CONTROLLER



Fielden's sensitive Series 97 Controller is now available in explosion-proof design for hazardous locations. Used with resistance temperature detectors, this controller actuates two-position control devices with changes as small as ±0.2° F. Ranges from −330° F. to +1382° F. Lamps show whether temperature is above or below control point setting.

Write for literature

Robertshaw-Fulton CONTROLS COMPANY

FIELDEN INSTRUMENT DIVISION

Dept. ⊕, 2920 N. 4th St., Philadelphia 33, Pa.

When inquiring check 2165 opposite last page

IDEAS

Research shows effect of water on cotton reactivity . . .

reveal acetylation works best when moisture is 8-22%

Moisture content and moisture absorption play an important part in determining reactivity of cotton acetylated by the acetic anhydride-pyridine method, according to studies carried out by US Department of Agriculture.

Tests show that raw cotton which has been dried prior to treatment with pyridine and acetic anhydride has little reactivity until 8 to 10% moisture has been absorbed. Degree of acetylation increases rapidly until the moisture content reaches 20-22%. Further increases in moisture content have little effect on the extent of acetylation.

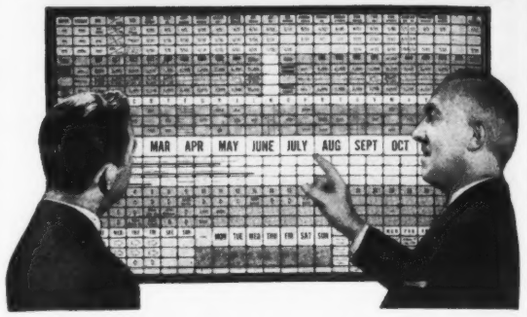
Raw cotton soaked in water shows no decrease in reactivity until moisture content has dropped to about 10%. Below this, acetyl content decreases rapidly.

Effects of several pretreatment agents were also investigated. Treatment with sodium hydroxide in concentrations of 15% and higher increased reactivity of cotton to acetylation. High reactivity was retained even when cotton was dried after the alkali treatment and before acetylation.

(Based on paper, "Influence of Moisture Sorption and Other Pretreatments on the Acetylation of Cotton with Acetic Anhydride and Pyridine". Reprints may be obtained from Southern Regional Research Laboratory, US Department of Agriculture, Dept. CP, 1100 Robert E. Lee Blvd., New Orleans 19, La. . . . or reader may simply check 2166 on convenient form opposite last page.)

This month's Processing & Engineering Data section begins on page 208

You Get Things Done Better By Seeing What's Happening



BOARDMASTER VISUAL CONTROL

- ★ Gives Graphic Picture of Your Operations in Color.
- ★ Easy to Use. Type or Write on Cards, Snap on Board.
- ★ Facts at a Glance - Saves Time and Prevents Errors.
- ★ Ideal for Production, Scheduling, Sales, Inventory, Etc.
- ★ A Simple, Flexible Tool - Easily Adapted to Your Needs.
- ★ Compact, Attractive. Made of Metal. 100,000 in Use.

Complete Price $49.50 Including Cards

FREE 24-Page ILLUSTRATED BOOKLET AA-30 Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

When inquiring check 2167 opposite last page

NEW! Uniform Pipe Identification System

Makes it easy and economical to standardize pipe marking

Free Planning Kit

- Shows you *how and where* to mark utility, process, and supply lines.
- Shows you how to *estimate costs.*
- Tells you how to *write specifications.*
- Simplified check list *figures your marking needs.*
- You can *compare actual costs* for painting and stenciling vs. the Brady System.
- *Planning Schedule* helps install marking system fast at lowest cost.
- You get *working samples* for testing.

If marking pipes is your responsibility, write for this valuable Planning Kit on your letterhead today.

W. H. Brady Co., 756 W. Glendale Ave., Milwaukee 9, Wis.

When inquiring check 2168 opposite last page

Coats durable, decorative vinyl on cold-rolled steel sheets by continuous process . . .

wide range of colors, embossings available

Uses: Big use will be in decorative applications, but chemical applications may also develop.

Features: Unbroken film (0.008-0.020" thick) will protect the metal surface from acids and other chemicals. Coated sheet combines the durability and decorative qualities of vinyl with the strength and ductility of steel. The vinyl coating can be supplied in a wide range of stable colors and can be embossed in various designs and textures.

The coating does not support combustion, has superior abrasion and electrical resistance. The excellent bond is retained even after severe forming or drawing into finished article.

Description: Product is available on a developmental basis from pilot plant production. Manufacturer, however, is hush-hush on any details of his production set-up.

The vinyl is continuously coated on cold-rolled commercial quality, or drawing quality special killed steel of 18 to 28 gage. Widths come in 24 to 52" (widest width not available in 24 gage or lighter), and lengths are 30 to 144". Coating is on one side only, and has a 60 to 90 Shore Duro.

Projection welding of ⅛ to ¼" diameter studs to the uncoated side of 26 gage coated steel has been performed satisfactorily. Welding sheets together, however, would break the film.

(Vinyl coated steel is a product of United States Steel Corp., Dept. CP, 525 William Penn Place, Pittsburgh 30, Pa. . . . or for more information check 2169 opposite last page.)

Helps executives keep up-to-date on management developments

Importance of operations research as a tool for problem solving and decision making is stressed in 111-page report. Avoiding excessive mathematical formulas and technical jargon, report defines terms, describes method, points to problem areas, and looks ahead to new developments and applications. Report shows how research is used in various industries and gives a good basic approach to this technical subject.

To obtain Special Report 13, "Operations Research: A Basic Approach" remit $3.75 ($2.50 for members) direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. When inquiring specify 2170 on form which is located opposite last page.

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the prefiring of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

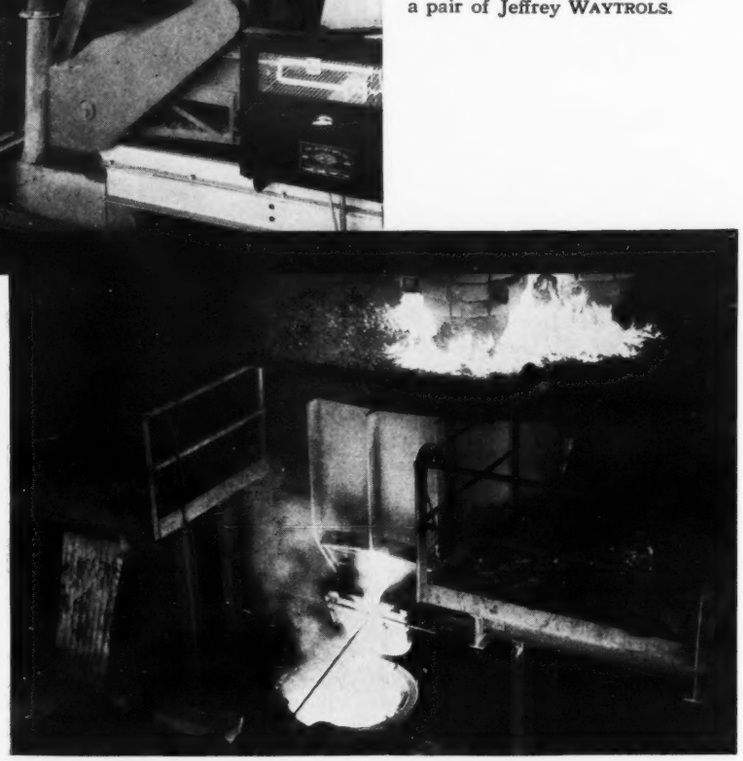
A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

When inquiring check 2171 opposite last page

WAYTROLS® feed an inferno with ± 1% accuracy

A metal producer reports ± 1% accuracy in proportioning with a pair of Jeffrey WAYTROLS.



Close formulation of the mixture as provided by WAYTROLS is vital to quality production in an electric furnace.

Mix an ore with slagging and reducing agents in the proper proportions. Apply the 3100° heat of an electric arc under carefully controlled conditions. Draw off the molten metal. Basically, that's the electrothermic process so widely employed today.

"Proper proportions" is the keynote to success. Inaccurate proportioning may ruin the entire process. Jeffrey WAYTROLS (continuous weigh feeders) help avoid that hazard.

WAYTROLS take materials from overhead hoppers and feed them at predetermined quantities or rates; so many ounces, pounds or tons per hour. They do this within the accuracy of the weighing equipment itself and without dependence upon the attention and judgment of the operator.

Weighing, batching and proportioning systems are described in Catalog 841. For a copy, write The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

When inquiring check 2172 opposite last page

IDEAS

Teflon-phenolic bearing material used for automobile suspension joint . . .

combines slipperiness of Teflon with high load carrying capacity of phenolic

Development of a bearing material, combining Teflon fabric and phenolic during the design of an automotive suspension joint, suggests that this material may be used for a number of other applications. Suspension joint involved a ball stud, and a bearing material, enclosed by two stampings and sealed.

By imbedding the Teflon fabric, which has a tensile strength of 50,000 psi, into the surface of the tough phenolic bearing material, an ideal bearing was achieved. This bearing combines the slipperiness of Teflon with a high load carrying capacity of phenolic. It has successfully passed the accepted test for this joint, one involving a million cycles under 3000 psi load at rate of one cycle per second. Maintenance lubrication was eliminated and joint still passed test. Joint is now being tested by the automotive industry.

Teflon-phenolic bearing material is being used for another application involving rod ends with self-aligning bearings for the aircraft industry. Teflon fabric is also being used as a facing for rubber seals and rubber bushings. This results in seals and bushings with low friction and high sealing properties. Success in these uses suggests that the bearing material may be used in other applications involving difficult or impossible places to lubricate and in uses requiring constant operation with little or no maintenance.

(Teflon-phenolic bearing material is development of American Metal Products Co., Dept. CP, 5959 Linsdale Ave., Detroit 4, Mich. . . . or for more information check 2173 on form opposite last page.)

"Yes, I've one complaint—the push button on this remote control could be padded."

Boron glass standard offered by Corning . . .

used for neutron cross-section measurements

Recommended by the Nuclear Cross-Sections Advisory Group of the Atomic Energy Commission and the Neutron Standardization Committee of the National Research Council, secondary neutron standards of boron glass are being offered by Corning Glass. Prepared in special melt for this purpose, the standard is available in form of 10″ discs, ¼ to ⅜″ thick.

Thinner and smaller samples can be cut and ground to specifications. Samples 2 x 2″ have been prepared as thin as 0.5 mm. Glass contains approximately 13 percent B_2O_3. Other constituents are materials with low molecular weights, and low neutron capture cross-sections.

(Further information on secondary neutron standards of boron glass can be obtained from Corning Glass Works, Dept. CP, Corning, N. Y. . . . or for more information check 2174 on the Reader Service slip opposite last page.)

Research on behavior of moving aerosols

Changes that occur in moving aerosol streams, methods of diluting moving aerosols, and accuracy and repeatability of aerosol sampling procedures are being investigated at Battelle Institute for the Army Chemical Corps. It is hoped that the results obtained from these investigations will be useful to the industry as a whole.

(Information courtesy of Battelle Institute, Dept. CP, 505 King Avenue, Columbus 1, Ohio.)

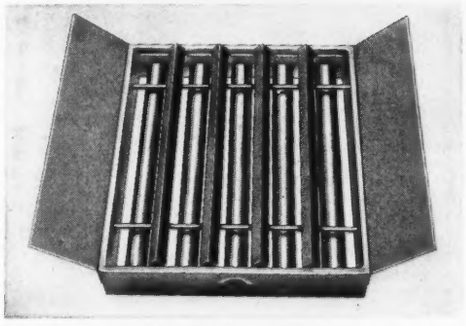
For more information on product at right, specify 2175 . . . see information request blank opposite last page.

AND HOLDING ON BY A MAGNET! There's quite a drop at the feet of this scaffold worker . . . but he is in no danger. He is holding on by a permanent-powered reliable Eriez Magnet. This idea of herculean power and permanent dependability is the reason why you find so many Eriez Magnetic separators at work in industry today, preventing fires, machinery damage and product contamination. *All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments. Their magnetic power is guaranteed forever. The first cost is the last.* Eriez also produces a full line of HI-VI Vibratory Equipment, consisting of Vibratory Feeders and Unit Vibrators. Heart of this unique equipment is a permanently powered Alnico V magnetic element which eliminates rectifiers . . . produces a two-way push-pull action for more productive performance . . . provides broader operating ranges with less power consumption. HI-VI units are lightweight, compact, easily installed, never need realigning, have no friction-producing parts to wear, need no lubricants.

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ HI-VI VIBRATORY EQUIPMENT

PULLEY CUTS CUSTOMER COMPLAINTS. At the Chicago Stock Yards Compost Co., "Fertilife" organic compost is produced. Bacterial processes speed up the composting period of the waste material (cow manure) and in four days the manure comes out as an odorless, weed-free compost. Previously, hinges, nails, even horseshoes managed to sneak into the bags of fertilizer. An Eriez Magnetic Pulley, recently installed at the end of the conveyor line that moves the dry material, now removes all traces of metal from the product. Customer complaints about tramp iron in the fertilizer have been completely eliminated.



THE GREAT GRATE MAGNET. It took a great design idea to provide magnetic protection for free-flowing material. With the Eriez Grate Magnet, baffle bars break the flow of material, direct the stream onto powerful magnetic tubes of stainless steel, so designed that the accumulation of tramp iron does not create choke-ups. The Eriez Grate Magnet prevents tramp iron damage to valuable equipment and prevents product contamination to free-flowing foods, chemicals, etc. Want more information on this product? . . . request Bulletin B-204.

Magnetic ideas from ERIEZ

SLURRY DRUMS SAVE STOCK SCREENS, PREVENT JAMMED JORDANS. More than 300 lbs. of tramp iron is removed each month by two Eriez HI-POWR Magnetic Slurry Drums installed in slurry lines at the Lawrence Paper Co., Kansas. Formerly, tramp iron damaged cylinder screens so badly they had to be replaced every three or four months. In addition, the metal jammed the four jordans in the line, causing a $4000 shell and filler replacement cost four times a year. Since the drums were installed, maintenance costs have dropped *more than 50%!* Designed for use in slurry lines in all industries, these self-cleaning drums are available in a wide range of widths and diameters.

Eriez' free booklet "Magnetic Ideas" can help you. Send for it without obligation. ERIEZ MANUFACTURING COMPANY, 73Q Magnet Drive, Erie, Pa. OR on your specific request Eriez factory-trained field men backed by Eriez' laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey and offer helpful "Magnetic Ideas."

New Carrier ~~NATURAL-FREQUENCY~~ Conveyors now offer higher capacity with greater dependability

90% of the operating power is supplied by leaf springs of

SCOTCHPLY
BRAND
REINFORCED PLASTIC

Low first cost and high conveying speed (up to 90 feet per minute) are only two of the reasons why Carrier "Natural-Frequency" Conveyors are the choice of more and more engineers.

An eccentric drive puts the trough into motion to move loose bulk materials by a series of high frequency "pitches and catches". This means screening and sizing can be done while conveying. Troughs may be covered for dust-proof construction. And drive stresses are distributed uniformly along the whole length of the conveyor by cantilever-type leaf springs.

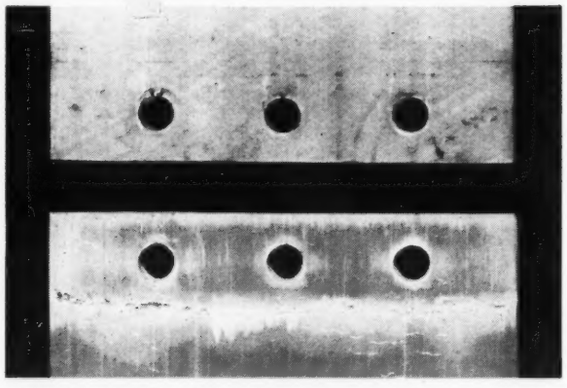
Choosing the leaf-spring material was no easy job. Carrier tested steel, resin impregnated laminated hardwood and other reinforced plastic materials. They found only "SCOTCHPLY" Reinforced Plastic answered every requirement: strength, resistance to fatigue and corrosion.

"SCOTCHPLY" Reinforced Plastic is an entirely new type high strength, light weight structural material with thousands of non-woven fine glass filaments uniformly aligned under even tension. 3M's background in adhesives has been used to achieve a lasting bond between the specially formulated thermosetting epoxy resin and the glass filaments.

3M research offers other resin systems for specific uses.

The terms "SCOTCH" and "SCOTCHPLY" and the plaid design are registered trademarks for the pressure-sensitive adhesive tapes and reinforced plastic made in U.S.A. by Minnesota Mining and Mfg. Co., St. Paul 6, Minn.—also makers of "SCOTCHLITE" Reflective Sheeting, "Thermofax" Copying Products, "3M" Abrasives, "3M" Adhesives, and many other products.

PRODUCT OF 3M COMPANY RESEARCH



UNRETOUCHED PHOTO shows results of test at Carrier Corp. Top: Unidirectional "SCOTCHPLY" Reinforced Plastic spring with isotropic faces was without damage after three weeks of running at double normal load. Bottom: Unidirectional polyester spring broke down after 15 hours.

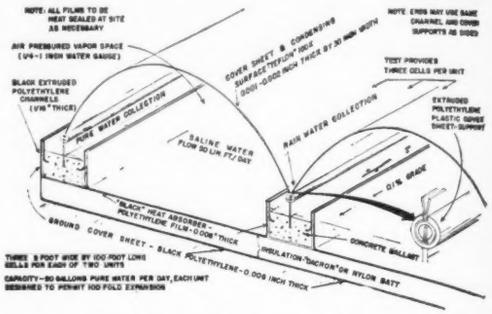
For complete information on the Carrier "Natural-Frequency" Conveyors, write Carrier Conveyor Corporation, Louisville 2, Kentucky.

For complete information on "SCOTCHPLY" Reinforced Plastic, write 3M Company, Dept. PA-37, St. Paul 6, Minnesota.

When inquiring check 2176 opposite last page

Plastic solar still designed to produce fresh water from sea

Under an agreement with the US Department of Interior, the Dupont Company has designed an experimental solar still for use in arid regions where drinking water is in short supply. Unit consists essentially of a heavy, black polyethylene


NOTE: ALL FILMS TO BE HEAT SEALED AT SITE AS NECESSARY
AIR PRESSURED VAPOR SPACE (1/4-1 INCH WATER GAUGE)
BLACK EXTRUDED POLYETHYLENE CHANNELS (1/16" THICK)
COVER SHEET & CONDENSING SURFACE-TEFLON* FILM
TEST PROVIDES THREE CELLS PER UNIT
EXTRUDED POLYETHYLENE PLASTIC SUPER SHEET-SUPPORT
PURE WATER COLLECTION
SALINE WATER FLOW 50 LBS./FT./DAY
RAIN WATER COLLECTION
"BLACK" HEAT ABSORBER-POLYETHYLENE FILM-0.006" THICK
GROUND COVER SHEET - BLACK POLYETHYLENE-0.006 INCH THICK
INSULATION-"ISOCRON" OR NYLON BATT
CONCRETE BALLAST
THREE 2 FOOT WIDE BY 100 FOOT LONG CELLS PER EACH OF TWO UNITS
CAPACITY-50 GALLONS PURE WATER PER DAY, EACH UNIT DESIGNED TO PERMIT 100 FOLD EXPANSION

Experimental solar still will use Teflon cover sheet

resin base covered with a curved transparent Teflon film (see drawing). In operation, heat from sun is trapped between base and canopy, causing saline water to evaporate from pan and condense on the curved overhead surface. Pure water is collected in troughs on side.

Prototype still will be about two feet wide and 100 feet long. Total cost of construction may eventually be as low as 40 cents per square foot and fresh water might ultimately be produced at an operating cost of 75 cents or less per 1000 gallons. The stills will be constructed and operated by the Government.

Solar stills have been developed in the past for this use, but costs have been too high to warrant wide-scale application. The use of transparent plastics, such as Teflon, capable of withstanding outdoor exposure for approximately 10 years, may provide the answer to the economic problem and make wholesale distillation of sea water feasible.

(Information courtesy of E. I. du Pont de Nemours & Company, (Inc.), Dept. CP, Wilmington 98, Del.)

Pocket-size engineering data books listed in handy catalog

Pocket-size reference books covering chemical analysis, chemical tables, general chemistry, industrial chemistry, petroleum engineering, physical and organic chemistry, and others are listed in handy 48-page catalog.

Data book catalog is issued by Lefax Publishers, Dept. CP, Philadelphia 7, Pa. Specify 2177.

Radioactive carbon traces cylinder concentrations of gasoline additives

Carbon-14 is being used to trace the precise distribution of gasoline additives to the cylinders of an engine. Method consists of "tagging" specific fuel additives with the radioactive carbon. When burned in the engine, tagged components form radioactive carbon dioxide.

Specially developed synchronized sampling valves take samples of the carbon dioxide in the combustion gases from each cylinder. Samples are also taken from the main exhaust stream. Comparison of the relative radioactivity of each sample shows consumption of tagged components by each cylinder. The total of the cylinder samples should agree with the consumption of the whole engine as indicated by the main exhaust samples.

(Based on paper presented at Tracerlab, Inc., nuclear symposium, by Douglas E. Cooper, Ethyl Corporation, Dept. CP, 100 Park Avenue, New York 17, N.Y.)

Electron-beam generator's operation discussed

Electron-beam generators for altering fundamental structure of matter to create new products or improve existing ones is described and illustrated in six-page bulletin. Construction and operation are explained. Major advantages are listed, and various applications are discussed.

Pub 7A-3655 is issued by X-Ray Dept., General Electric Company, Dept. CP, Milwaukee 1, Wis. When inquiring specify 2178 on the convenient Reader Service slip which is located opposite last page.

For more information on product at right, specify 2179 . . . see information request blank opposite last page.

A REFRIGERATOR, TOO, CAN BE THE STRONG, SILENT TYPE

One home refrigerator with a reputation for silence and long service life depends upon B&W for "the type of tubing necessary to the efficient operation of the refrigerator. Without it, the refrigerator could not provide the required performance. It must last the life of the unit."

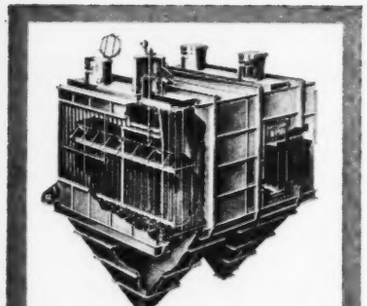
To meet that tough specification for evaporator coils and high temperature coils, B&W supplies Electric-Resistance-Welded Tubing with precision-made serrations on the I.D. Rockwell hardness must be held within close tolerances, and the seam-weld must withstand 1,000 pounds pressure—no interior surface copper is permitted.

For special applications like this, get in touch with Mr. Tubes, whose specialty is matching tubes to jobs to save you time and money. For many Electric-Resistance-Welded tubing requirements, you'll find that your nearby B&W distributor maintains comprehensive stocks to meet your needs. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

Seamless and welded tubular products, seamless welding fittings and forged steel flanges in carbon, alloy and stainless steels

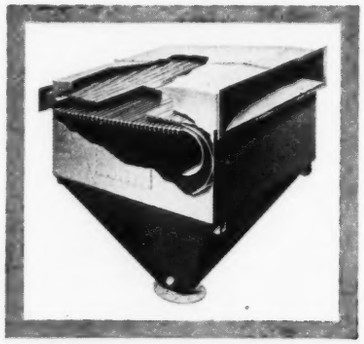
TA-6074-GP

How Buell's exclusive Shave-off pays off in extra dust collection efficiency



Buell SF Electric Precipitator also delivers extra dust collection efficiency, due to unique Spiralectrodes and Continuous Cycle Rapping.

Proper proportioning, side entry of dust-laden gases, add even more extra efficiency and long, maintenance-free life to Buell Cyclones. Large diameter design eliminates bridging and clogging, keeps efficiency high under varying loads.



Buell Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or mechanical draft installations.

For more specific data about Buell's *extra efficiency*, write Dept.
Buell Engineering Company,
70 Pine Street,
New York 5, N. Y.

buell®

MECHANICAL ELECTRICAL *Experts at delivering Extra Efficiency in* **DUST COLLECTION SYSTEMS**

When inquiring check 2180 opposite last page

Metal research speeded by small furnace

Small melts of metals and alloys are being produced quickly in a compact, 50-pound electric melting furnace at Superior Tube Company, Norristown, Pa. Used as a research tool, furnace saves

Furnace is used for producing experimental melts

valuable time by permitting company to produce its own raw stock without having to wait for supplies from an outside source.

The small cast billets are then turned, drilled and cold-drawn into small-diameter tubing for evaluation of physical, mechanical and chemical properties. Experimental melts from the furnace are also being used for developing new cathode materials. When used in vacuum tubes, these cathodes provide high strength, long life, freedom from sublimation effects, and absence of interface impedance.

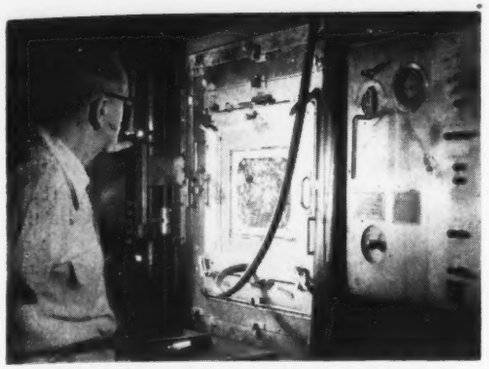
(Information courtesy of Superior Tube Company, Dept. CP, Norristown, Pa.)

Metal decorating enterprise pays off for steel firm . . .

operation boosts steel sales, serves as proving ground for its products

Diversification seems to be a sign of the times — even with steel plants. Take the case of Wheeling Steel Corporation: At its Yorkville, Ohio, works, they're in the metal decorating (coating and lithography) business. Thousands of tons of flat-rolled steel are processed a year. Benefits are twofold: 1) operation boosts steel sales, and 2) it serves as proving ground for the coating and decorating qualities of their tin mill products and cold-rolled sheets which are sold in larger tonnages to customers who have their own decorating facilities.

Production areas in the 220x440′ building are laid



Rutherford photocomposing machine is used to transfer a design from film or glass to a press plate

out for straight-line, automatic lithographing, or coating of 70- to 128-lb black plate; 70- to 135-lb electrolytic or hot-dipped tin plate; and 28- to 18-gage cold-rolled sheets. To complement its printing presses, plant has six Wagner coaters which are used for applications of lacquers or enamels. Four

General view of processing area showing decorated sheets coming out of drying ovens

of these are equipped with single drying ovens capable of coating only one side of the sheet with one pass. Other two are tandem coaters set so that sheet receives a coat on one side, passes through a drying oven, then receives a coat on reverse side, and continues on through second drying oven.

Two of the single coaters will handle a maximum sheet size of 36x44"; the third 36x42"; and the fourth 36x48". Maximum sheet size limits for the two tandem coaters are 28x38" and 30x38". Depending upon requirements, 7 to 15 minutes lapse from time sheet is fed into coater until it comes out of oven. Decorated sheets are automatically fed through one of two machines which spray a protective coat of wax on either one or both sides.

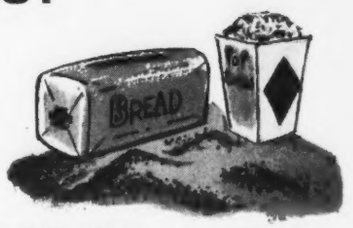
An average of 150 men are employed in the decorating plant. These include necessary pressmen and plate makers. Wheeling's Yorkville steel mill works around the clock; likewise the coaters and presses can be operated on a three-shift schedule.

(Information courtesy Wheeling Steel Corporation, Dept. CP, Wheeling, W. Va.)

Q. What's the best way to store and handle these bulk materials?

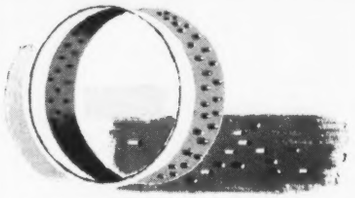
1. **MEAL** — alfalfa, meat, soya, corn, barley and other grain meals.

2. **WOOD PRODUCTS** — chips, flour, sawdust, shavings and cork.



3. **EDIBLE PRODUCTS** — flour, sugar, starch, malted milk powder, malted barley, dried milk, popcorn and other whole grains.

4. **CHEMICAL COMPOUNDS** — insecticide powders, pharmaceuticals, urea, ground rubber, clays.



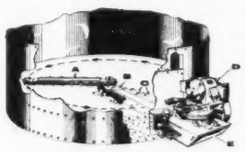
5. **PELLETIZED MATERIALS** — alfalfa, urea, oil meals, nitrates and other chemicals.

ILLUSTRATED HERE are a few of the many bulk materials that can be stored and handled by Permaglas Storage Units. Variety of products and industries served is practically unlimited. If you have a storage and handling problem, we will be glad to discuss its solution with you.

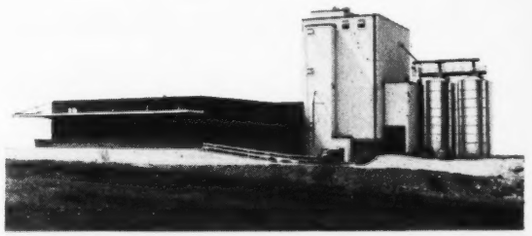
A. Mechanize the job completely with A. O. Smith Permaglas® Storage Units

WHATEVER your bulk materials storage and handling problems, it will pay you to investigate A. O. Smith Permaglas Storage Units. A modern materials-handling system incorporating these units lets you *store more in less space . . . at lower cost.*

- **Greater overall efficiency** — Incoming materials are conveyed directly into the Permaglas Storage Unit. Exclusive sweep-arm bottom unloader automatically discharges bulk materials into your apportioning system — by the batch or in continuous process.
- **Reduced materials-handling costs** — Permaglas Storage Unit is designed for maximum filling. Permits economical bulk-lot materials purchasing. Eliminates costly man-handling of incoming packages as well as in-plant trucking.
- **Maximum use of space** — Variety of heights and diameters available in Permaglas Storage Units assures maximum use of storage space in existing locations or new facilities.
- **Minimum maintenance costs** — Permaglas Storage Units are glass-protected steel, inside and out. No internal corrosion from stored materials. No expensive exterior maintenance as with conventional structures.



OPERATING PRINCIPLE OF A. O. SMITH SWEEP-ARM BOTTOM UNLOADER. As unloading arm (A) moves counter-clockwise, endless chain on arm moves the material to the center where it drops into sub-floor conveyor trough (B) for removal at discharge opening (E). Two steel plates (C) cover chain conveyor. Entire mechanism is powered by Electric motor (D).



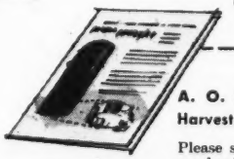
The Permaglas Storage Unit installation, with mechanized sweep-arm bottom unloaders, is the heart of this modern bulk materials-handling system.

Through research A.O.Smith *. . . a better way*

A.O.Smith
CORPORATION

HARVESTORE PRODUCTS
Kankakee, Illinois
Distributor: SPROUT-WALDRON
Muncy, Pennsylvania

Mail coupon for 6-page bulletin on Permaglas Storage Units with mechanized bottom unloader.



A. O. SMITH CORPORATION
Harvestore Products, Kankakee, Ill., Dept. CP-37

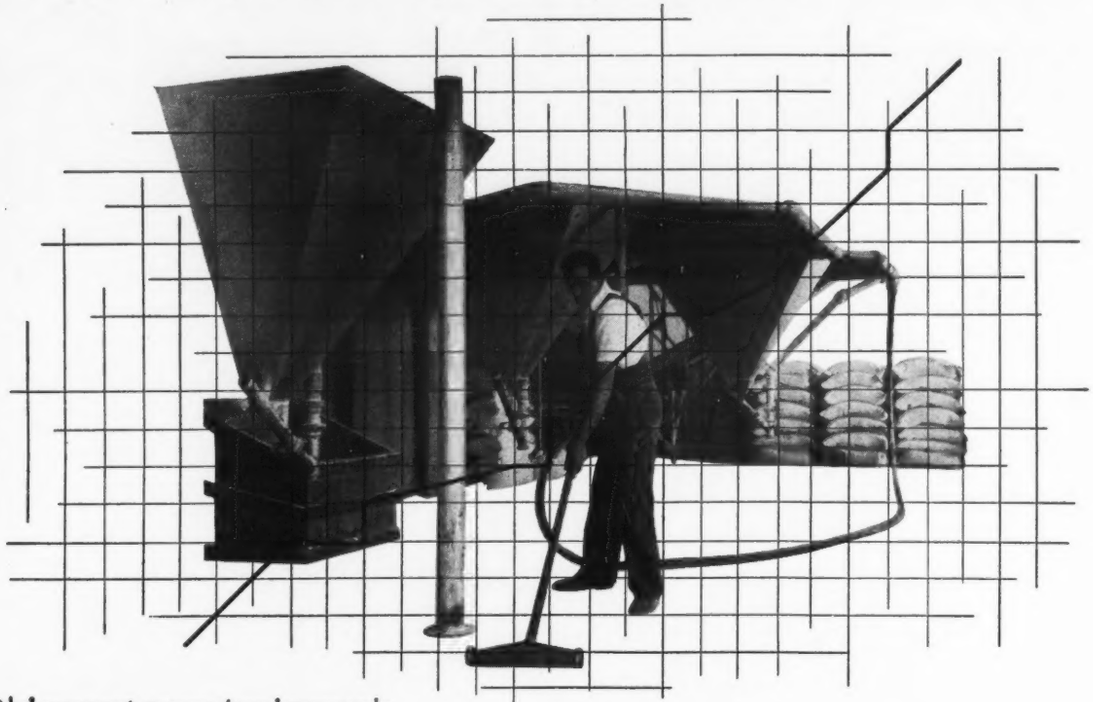
Please send me more information and data about Permaglas Mechanized Storage Units.

Name.....
Firm.....
Address.....
City.....Zone.....State.....

MU-2333

When inquiring check 2181 opposite last page

Hoffman engineered systems get **results:**



this custom-designed

HOFFMAN STATIONARY VACUUM CLEANING SYSTEM

aids plant cleanliness...recovers valuable product!

The Holly Sugar Corporation has always been proud of—and noted for—its "housekeeping". In its refinery at Brawley, California, three or four men were assigned to daily hand-sweeping but the management soon realized that sweeping removed only part of the dust while the remainder was moved and rescattered through the plant.

Hoffman was asked to survey the requirements; and designed a stationary vacuum cleaning system, with the following features:

1. Adequate capacity for rapid and thorough cleaning of the entire plant with sufficient inlet valves to make the work as easy as possible.
2. Convenient location of the separators so the collected material is dumped directly into "remelt" for recovery of sugar.
3. Connections for 2" vacuum hoses at points where spills had previously required laborious and costly handling.
4. Much of the dust in the plant was seeping from the housings of the bucket elevators and storage bins, so special vacuum connections, creating a slight negative pressure from the enclosures into the pneumatic system, prevented the material from escaping as dust. This was then recovered with the rest of the sugar picked up in vacuum cleaning.

As a result of the Hoffman installation, Holly Sugar now has a cleaner plant—with only two sweepers!

Let Hoffman offer recommendations for **your** needs, whether they are cleaning, conveying, recovery or all three. Your letter for detailed information or an engineer's survey will get prompt attention, without cost or obligation.

AIR APPLIANCE DIVISION **U.S. HOFFMAN MACHINERY CORPORATION** DEPT. CP, 103 FOURTH AVENUE, NEW YORK 3, N.Y.

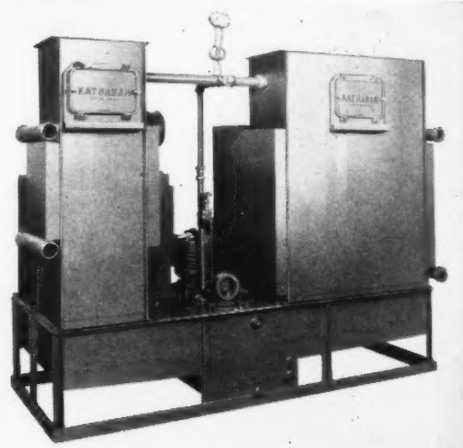
AIR APPLIANCE DIVISION Multistage Centrifugal Blowers and Exhausters. Pneumatic Conveying Equipment. Industrial Vacuum Cleaning—Portable and Stationary Systems. Continuous Metal Strip Driers. "Smoothflow" Fittings and Tubing. **INDUSTRIAL FILTRATION DIVISION** Machine Tool Coolant Clarifiers—Flotation, Mechanical, and Magnetic. Lubricating and Insulating Oil Conditioners, Filters, and Vaporizers. Solvent Recovery Systems—Vacuum Stills and Filters. **ORDNANCE EQUIPMENT DIVISION** Special Pneumatic Conveying Systems, High Efficiency Centrifugal Separators. Stationary and Portable Vacuum Cleaning Equipment. Process Equipment. Pneumatic Systems for Radioactive Materials.

When inquiring check 2182 opposite last page

Over 97% of airborne bacteria killed by chemical humidity conditioner . . .

tests conducted at University of Toledo indicate LiCl in equipment acts as germicide

Workers at University of Toledo report that "Kathabar" humidity conditioning equipment is effective in eliminating micro-organisms from the air it conditions. In their tests, 97% or more of airborne bacteria present in room air was removed.



Typical 2500 cfm Kathabar unit

Tests were made in two Toledo hotels, one containing a Kathabar installation, the other a conventional refrigeration system. Samples were taken at various points and cultures were made for colony count. Typical data for the Kathabar installation:

Station	Colony Count
Return Air	533
After Coils	531
To Humidity Conditioner	525
From Humidity Conditioner	9.7

However, in the hotel using conventional refrigeration equipment, microbe counts actually increased after passage of air through system — refrigeration coils apparently provide medium for growth on surface. Typical data:

Station	Count
Fresh Air	809
Air to Coils	800
Air from Coils	885
Return Air	817

Air entering the Kathabar unit is held at given temperature and flooded with moisture-absorbing lithium chloride to dehumidify it. Amount removed is dependent upon the temperature of the air, and can be closely controlled. The lithium chloride solution is automatically regenerated by heating to drive off moisture. This is done a small portion at a time, so that conditioner can operate continuously.

Germicidal effect of conditioner is attributed to the lithium chloride. The Toledo workers conducted their tests over two-month summer period, collected nearly 400 samples in the process.

(Surface Combustion Corp., manufacturer of Kathabar equipment, is located at Dept. CP, Grofer & Sherman Sts., Toledo 1, Ohio . . . or for more information check 2183 opposite last page.)

Stronger, tougher steel produced with degassing process . . .

metal is free of discontinuities, more reliable

A stream-degassing process featuring a 10-ton degassing unit has been developed for the production of more uniformly reliable steel. By removing trapped gases, process permits production of metal that is free of discontinuities which are caused by presence of hydrogen and other gaseous inclusions. Besides insuring reliability of the steel, degassing also improves the mechanical properties.

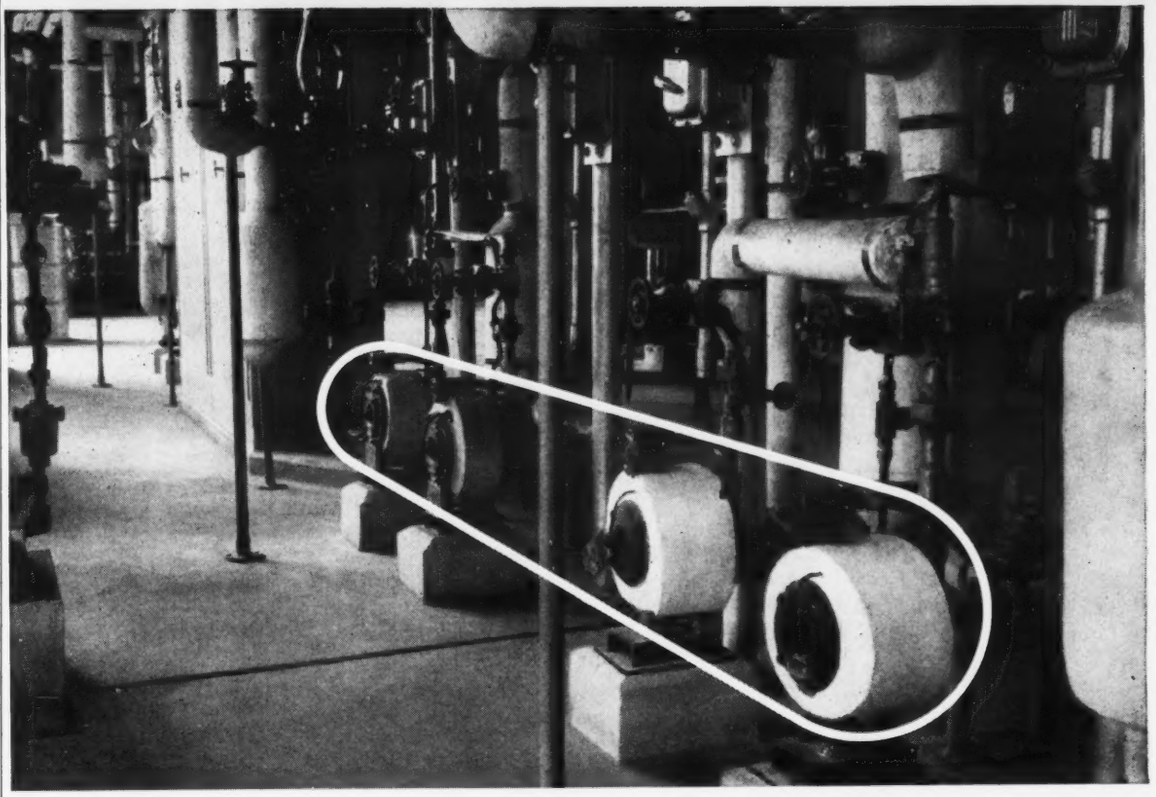
The entrapped gases are removed from the steel immediately after it is tapped from the open-hearth furnace. The steel is poured in a thin stream into a vacuum chamber, where it breaks down into a shower of finely divided particles. In this way, sufficient surface area is exposed to the exhausting force of the vacuum to cause removal of the major portion of trapped gases from the metal. Degassed steel then drops into a conventional ingot mold and solidifies. The vacuum chamber, which has a volume of approximately 1200 cubic feet, is pumped down to high vacuum. An aluminum diaphragm seals opening to the chamber from the antechamber, a specially shaped receptacle on top of the vacuum chamber. Steam ejector evacuation system used is one of the largest high vacuum gas handling systems ever applied for metals processing.

(Steel stream-degassing process was developed by F. J. Stokes Corporation, Dept. CP, 5550 Tabor Road, Philadelphia 20, Pa. . . . or for more information check 2184 on form opposite last page.)

Photos show research facilities of company's laboratories

Central research laboratory facilities and methods are described and portrayed in digest form in 24-page brochure. Chemical, mechanical, physics, nuclear, and processing research projects are covered, including work on taconite ore, ceramics, heat transfer, and pyro-processing reactions. Over 40 photos are included.

Bul 48B8448 is issued by Allis-Chalmers Manufacturing Co., Dept. CP, 1151 S. 70th St., Milwaukee, Wis. When inquiring specify 2185 on form opposite last page.



Chempump guards product purity

handling fine chemicals at Newport Industries plant

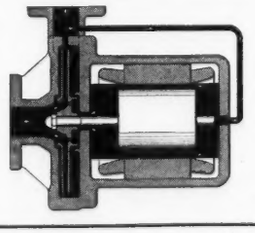
Forty-five *Chempumps* help keep product quality high and maintenance costs low at Newport Industries' new Fine Chemicals Plant at Pensacola, Florida.

These canned pumps handle synthetic U.S.P. Menthol, N.F. Thymol, U.S.P. Camphor, other high purity pharmaceuticals, and rubber chemicals. Leakage or contamination, which could be mighty costly in this application, are entirely eliminated. *Chempump* can't leak—in or out—because it has no seals, no stuffing box, no packing.

To further ensure absolute purity of products, pumps handling intermediates and final products are stainless steel. The pumps shown are steam traced and insulated to maintain required temperatures. All stators are protected with Class H high-temperature electrical insulation.

For Newport Industries, *Chempump* means completely closed-system fluid handling. What's more, the simplicity of *Chempump* design reduces maintenance to an occasional inspection and replacement of bearings. External lubrication is never required—bearings are constantly lubricated by the pumped fluid itself.

Why not profit by *Chempump's* many major advantages in your plant? For details, write to Chempump Corporation, 1300 Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000F. and pressures to 5000 psi.

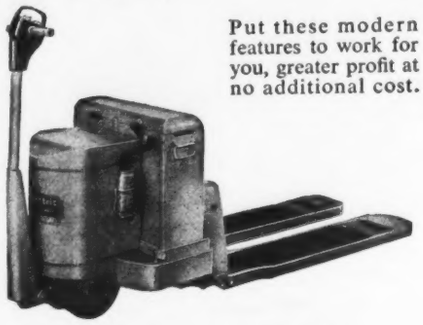
Chempump

First in the field...process proved

When inquiring check 2186 opposite last page

A modern truck for modern plants
The HydroLectric
with most modern features

- 2 Drive Wheels instead of one
- 2 Braking Systems available instead of one
- 4 Wheel Stability instead of three
- Alloy Gear Transmission instead of chains
- 100% more Steering Ease —Greater Maneuverability
- 50% less Maintenance —Easy Accessibility
- Finger-Tip Control —Greater Safety



Put these modern features to work for you, greater profit at no additional cost.

Write for Bulletin KW

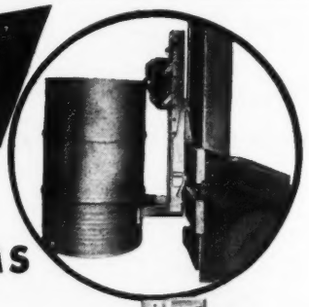
STUEBING Designed • Engineered • Built

LIFT TRUCKS, INC. / CINCINNATI 14, OHIO

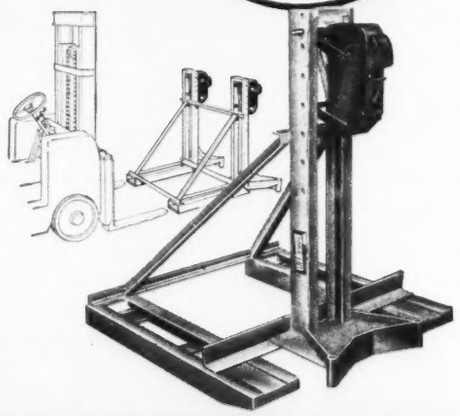
THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

When inquiring check 2187 opposite last page

USE THE
POWER TRUCK ATTACHMENT
LIFT-O-MATIC
for
HANDLING DRUMS
with a
POWER
FORK TRUCK
WITH FORKS LEFT ON
OR
REMOVED

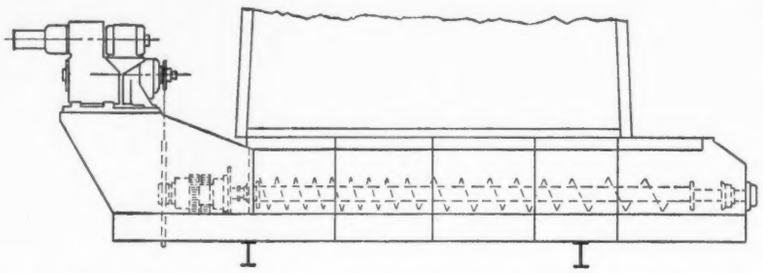


Simple, automatic, mechanical handling of any size or type of drum—single or multiple.



WRITE FOR CATALOG
MARVEL INDUSTRIES, Inc.
2234 CLEVELAND ST., EVANSTON, ILLINOIS

When inquiring check 2188 opposite last page



Activated-bottom bins will feed from 12,000 to 48,000 lb/hr of coarse corn fiber, in a smooth stream

Feed to dryers at Corn Products Refining dipped and surged according to filter press load variation until company added . . .

live-bottom bin

THEODORE W. WETT, Assistant Editor
With **MR. M. L. BULLARD,** Division Superintendent
Corn Products Refining Co., Pekin, Illinois

Problem: At Corn Products Refining Co., quantities of material being fed to dryers varied over a wide range according to load variation on filter presses in batch portion of corn processing. This "too much or too little" feed caused peaks and valleys in process stream load, reduced efficiency of entire operation.

Solution: In Sept. 1955 Corn Products installed two activated-bottom bins to handle corn fiber — corn kernel with germ, starch, and glutin removed. Dewatered coarse fiber is fed to larger bin directly. Fine fiber is dewatered in filter presses and dropped to smaller bin. Bins feed specified amounts of coarse and fine fiber to mixer where they are blended with some dry return from dryer, steepwater is added, and mixture fed to dryer.

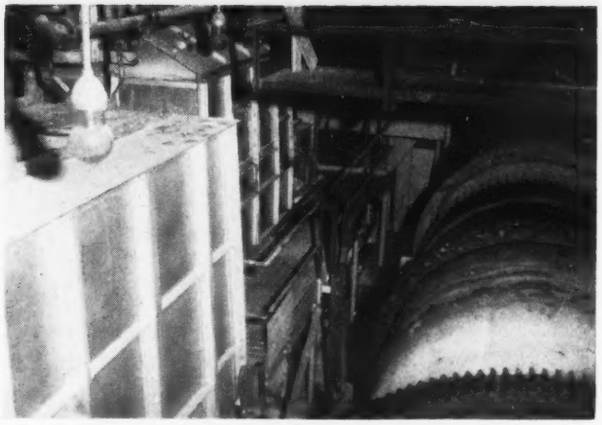
Gluten, after being processed to remove starch, is dewatered in plate filter presses and dumped into a third bin (installed Nov. 1955). Here it is fed, with dry returns for conditioning, into mixer and then to a separate dryer.

Large bin, handling coarse fiber at 21 lb/cu ft, has a level-full capacity of 1400 cu ft and will deliver from 12,000 to 48,000 lb/hr. Smaller bin, for fine fiber, at 25 lb/cu ft, has a capacity of 400 cu ft and will deliver from 7000 to 28,000 lb/hr. Gluten bin delivers 10,000 to 40,000 lb/hr of gluten at 41 lb/cu ft. It has a level-full capacity of 200 cu ft.

Fiber-handling units have variable-speed drives, roller-chain connected to one screw in each battery of three, the other two being driven by gears. Large bin has twelve screws, smaller one six. Gluten bin has one drive for each of two pairs of screws.

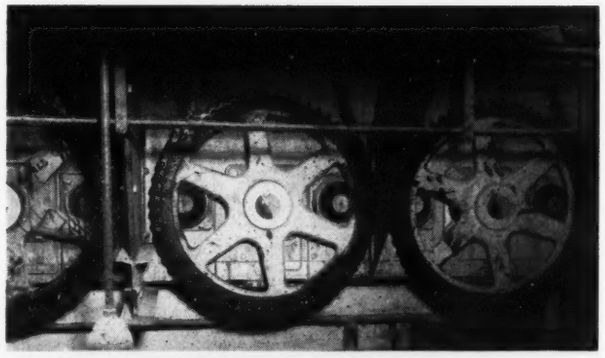
Bins are designed so that material is fed to rotating screws at bottom. Screws feed material in a uniform stream regardless

(Please turn to page 94)

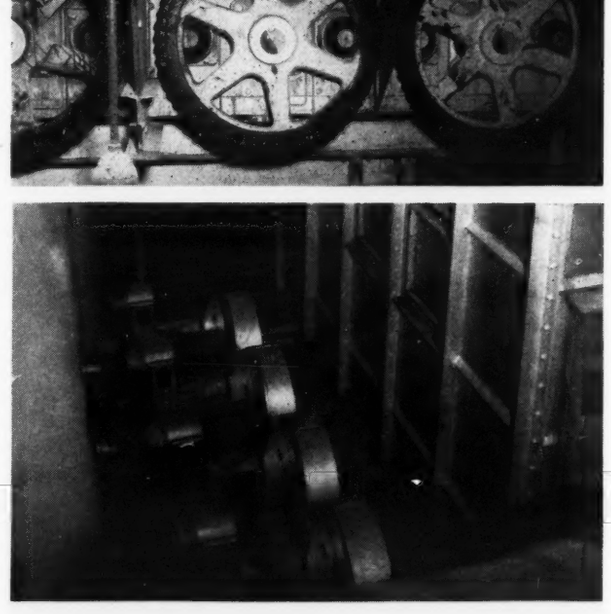


Two bins at left prevent peaks and valleys in process stream load to dryer at right

ttom bins to smooth process flow



Roller chain connects drive to set of three screws. Bin has total of twelve screws



Each variable-speed drive operates three feed screws in bin bottom

Cut **10 TONS**

of PLASTIC PELLETS IN AN HOUR *without* LONGS OR FINES

Manufacturers are cutting 10 tons of plastic pellets an hour on these new 700 series cutters. The pellets are cut to uniform size — without fines or longs.

Taylor-Stiles 700 series pelletizers are available in two models. One cuts continuous sheet stock into strips and then crosscuts the strips into pellets. The other cuts rods, as they come directly from the extruder, into pellets.

700 Series cutters are equipped with 12 or 24 fly knives as required. They are made in four sizes, 6", 10", 12", and 14" wide.

If you are interested in increased output of uniformly sized pellets it will pay you to investigate 700 series cutters which are being used today by many of America's leading plastics producers.

Write us today for our new folder 210 with complete details of our 10-ton-an-hour 700 Series cutters, and for folder 213 with complete information about our several types of dicing cutters.

TAYLOR, STILES & COMPANY

20 Bridge Street **Riegelsville, New Jersey**

Mail coupon today for complete details.

TAYLOR, STILES & CO. 20 BRIDGE ST., RIEGELSVILLE, N. J.

Send me four page folder No. 210 and No. 213 illustrating and describing Taylor Stiles Pelletizers for sheet stock and rods.

Name .....

Company .....

Address .....

City ..... State .....

When inquiring check 2189 opposite last page

Live-bottom Bins

(*Continued from page 92*)

of level to provide a conversion from batch operation to continuous process. Dried products are used to produce Buffalo Corn Gluten Feed and Diamond Corn Gluten Meal. About 400 tons of gluten feed and meal are produced per day from 900 tons of starting material.

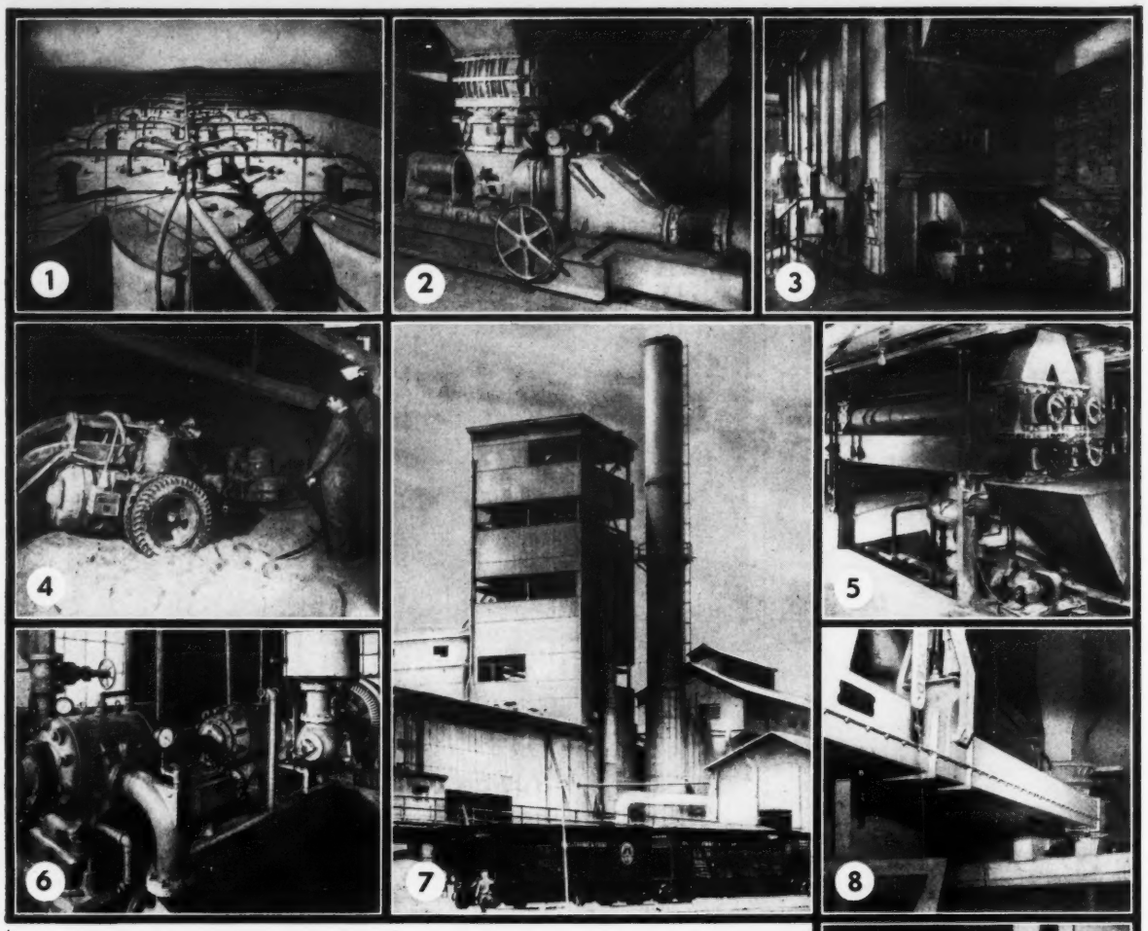
Results: Greater production, smoother operation with no peaks or valleys in material stream, and a more uniform product has resulted from use of bins. They will not plug, and will convert surges of material going into this portion of process into a smoothly flowing stream.

(Live-bottom bins and mixers are a product of Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. . . . or for more information check 2191 on form opposite last page.)

Explains sump-type grinder design and operation

Design, operation, construction, installation, and types of drive are topics of eight-page product data sheet on sump-type double-roll grinder. Unit is installed in a sump where solids are sized prior to being pumped through a pipeline. Dimensional and cut-away drawings are included.

Data Sheet Ra is issued by The Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. When inquiring specify 2192 on form opposite last page.



THE RIGHT TOOLS FOR THE BEST RESULTS

1. Fuller-Kinyon System conveying to silos.
2. Fuller-Kinyon Portable Pump underneath silos.
3. Fuller Inclined-Grate Cooler.
4. Fuller-Kinyon Remote-Control Unloader.
5. Fuller Dry Pulverized-Material Cooler.
6. Fuller Rotary Two-stage Compressor.
7. Fuller-Humboldt Suspension Preheater.
8. F-H Airslide Fluidizing Conveyor.
9. Airveyor Pneumatic Conveying System.

WE ALSO BUILD
Feeders & Rotary Valves
Material-Level Indicators
Motion Safety Switch
Aeration Units
Slurry Valves

The experience of thirty years of research, designing, and building equipment for the chemical process industry, has given Fuller engineers a vast amount of "know-how", knowledge which is passed along to the user in better and more efficient equipment. Such experience is something that is difficult, if not impossible, to write into specifications or show on blue prints, yet is inherent in Fuller engineering and equipment.

This experience, and a large capable staff, place us in an excellent position to assist you in determining the most efficient equipment for conveying, cooling, and preheating dry pulverized and granular materials; application of compressors and vacuum pumps for handling air and gases; feeding and aeration of dry bulk materials.

Your first step toward achieving efficiency, at the lowest possible cost, is to call in a Fuller engineer to review your requirements and to make specific recommendations.

Bulletin G-3, "Fuller Equipment for the Process Industries", will give you a comprehensive preview of services rendered and equipment manufactured by Fuller. Write today . . . we'll gladly send you a copy.

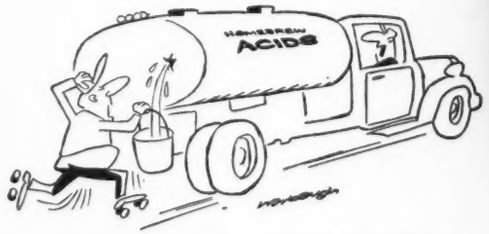
FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

FULLER COMPANY GENERAL AMERICAN TRADE MARK

G-136
3657

Fuller DESIGNERS AND BUILDERS OF BETTER EQUIPMENT FOR THIRTY YEARS

When inquiring check 2190 opposite last page



"After we sell this batch we can invest in some tank liners."

For more information on product advertised at right, specify 2193 . . . see information request blank opposite last page.

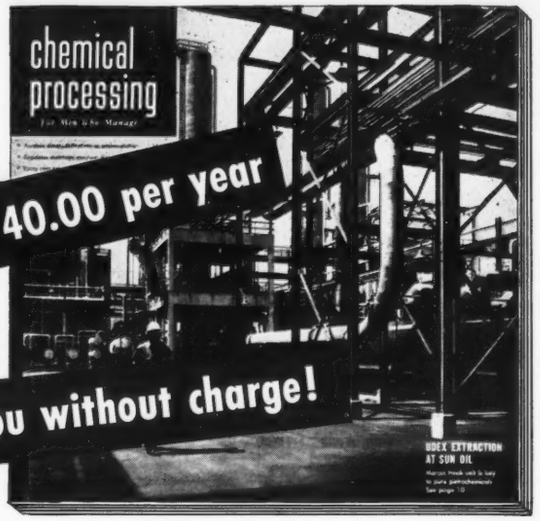
On the go . . . always going . . . seldom gone

Thousands of hours have gone into engineering better performance into this new *Clarklift*. Many of those hours were spent getting *down* time *out* of it. The results are qualities you *can't* see readily—a ruggedness of construction that defies the punishment of the most severe service. And so the *Clarklift* goes . . . and goes . . . and goes.

What's more, there's unmatched performance built into this truck. Safety, too. And when we say routine maintenance, we mean *routine*. And these are things you *can* see—either on the truck itself or in performance records. Or in savings that will set entirely new records for the lift truck industry. Try this new *Clarklift*. You'll see what we mean.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

CLARK® EQUIPMENT



This magazine costs more than $40.00 per year

...yet comes to you without charge!

Why? Maybe, like many others, you've wondered why CHEMICAL PROCESSING comes to you *without charge* — while, perhaps, you pay a subscription price for other business magazines.

Maybe you've thought publishers *make money* when they sell you a $3.00 or a $5.00 subscription.

No—publishers lose money . . . yes, most business magazines lose money when they sell a subscription — not only because the magazine costs more to produce than the subscription price brings in — but also because the cost of making such sales exceeds the income for $3.00 or $5.00 subscriptions.

Advertisers pay the bills — You see, it's the money that comes from advertising that keeps the business magazine publisher in business. So, logically, such advertisers *demand* best possible coverage of folks like you—the important key men who exercise buying power.

So—CHEMICAL PROCESSING "hand-picks" best readers . . . and sends the magazine to these key folks, without charge.

For you simply can't get maximum coverage of these important folks by trying to sell subscriptions. These men, limited in numbers, are scattered all over the U.S.A.: travel and/or direct mail cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

CHEMICAL PROCESSING gets best circulation . . . So, as you can see, to get the best, most effective circulation coverage, the best way is to "hand-pick" the right readers, then send the magazine to them. This gives value to advertisers which can't be gotten in any other way.

That's why . . . CHEMICAL PROCESSING "hand-picks" only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this valuable service costing more than $40.00 per year, per reader. That's why CHEMICAL PROCESSING comes to you without charge—*you are an important reader in the chemical field.*

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing

published by Putman Publishing Company

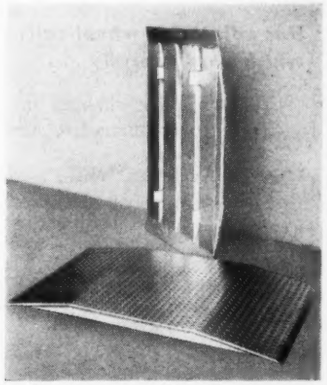
PUTMAN PUBLISHING

also publishers of:
FOOD PROCESSING
FOOD BUSINESS
INDUSTRY POWER
"Executive Magazines for Industry"

Metal freight-car aprons for lightweight, fast bridging . . .

two-inch thick ramps will support axle loading of 50,000 lb. Weigh near 100 lb

Uses: As bridging between flat cars in truck-rail, "piggy-back" service. Aprons are also used for other applications where lightweight bridging is desired for movement of heavily loaded vehicles.



Magnesium freight-car aprons are used in pairs to form ramps for bridging

Features: Special welding process and design enables aprons to support axle loading of 50,000 lb. Small thickness (2") eliminates underclearance problems.

Description: Made of magnesium and weighing less than 100 lb, aprons can be positioned by one man. Used in pairs, they measure 30" wide by 56" long. It is reported that customary bump encountered when vehicle crosses ramp is substantially minimized.

(Freight-car aprons are manufactured by Lite Line Industries Division, Copperloy Corp., Dept. CP, 4103 Brookpark Rd., Cleveland 29, Ohio. Check 2194 opposite last page.)

Why will a CLARKLIFT hold up longer?

Can you be sure that a *new* model truck will (1) perform better and (2) *stay* on the job with less time out? You can with the new *Clarklift:* Clark has built over 250,000 lift trucks . . . far more than any other builder. This experience helps us make them better. Then Clark tests the new truck for thousands of hours—equal to many years of actual service.

We've already *proved* the new safety roller-upright reduces friction and wear, has longer life; unitized frame construction with built-in sump and gas tank, providing greater rigidity; a vanadium steel steer axle with greater tensile strength; big rear wheels to reduce shocks from uneven floors. And many more. Ask your Clark dealer for a demonstration.

Industrial Truck Division
Clark Equipment Company
Battle Creek 9, Michigan

CLARK® EQUIPMENT

For more information on product at left, specify 2195 . . . see information request blank opposite last page.

Hoisting equipment listed

Features and specifications of company's line of hand, ratchet, and geared hoists are presented in 44-page catalog. Also described is line of plain and geared hand hoist trolleys. Units are available with capacities of ½ to 40 tons.

Catalog is issued by The Yale & Towne Manufacturing Co., Dept. CP, 11,000 Roosevelt Blvd., Philadelphia 15, Pa. When inquiring specify 2196 on form which is located opposite last page.

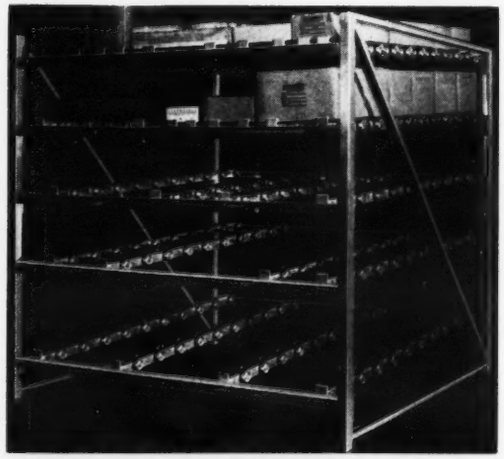
Has adjustable wheel-rails which slide laterally . . .

allows quick changes in spacing on storage rack to accommodate new package sizes

Uses: As gravity wheel storage rack for first-in, first-out storage of packages and flat-bottomed items.

Features: Storage rack has adjustable wheel-rails which slide laterally for quick changes in spacing to accommodate new package sizes.

Description: Storage rack consists of inclined wheel-rails mounted in a steel frame. Frame is

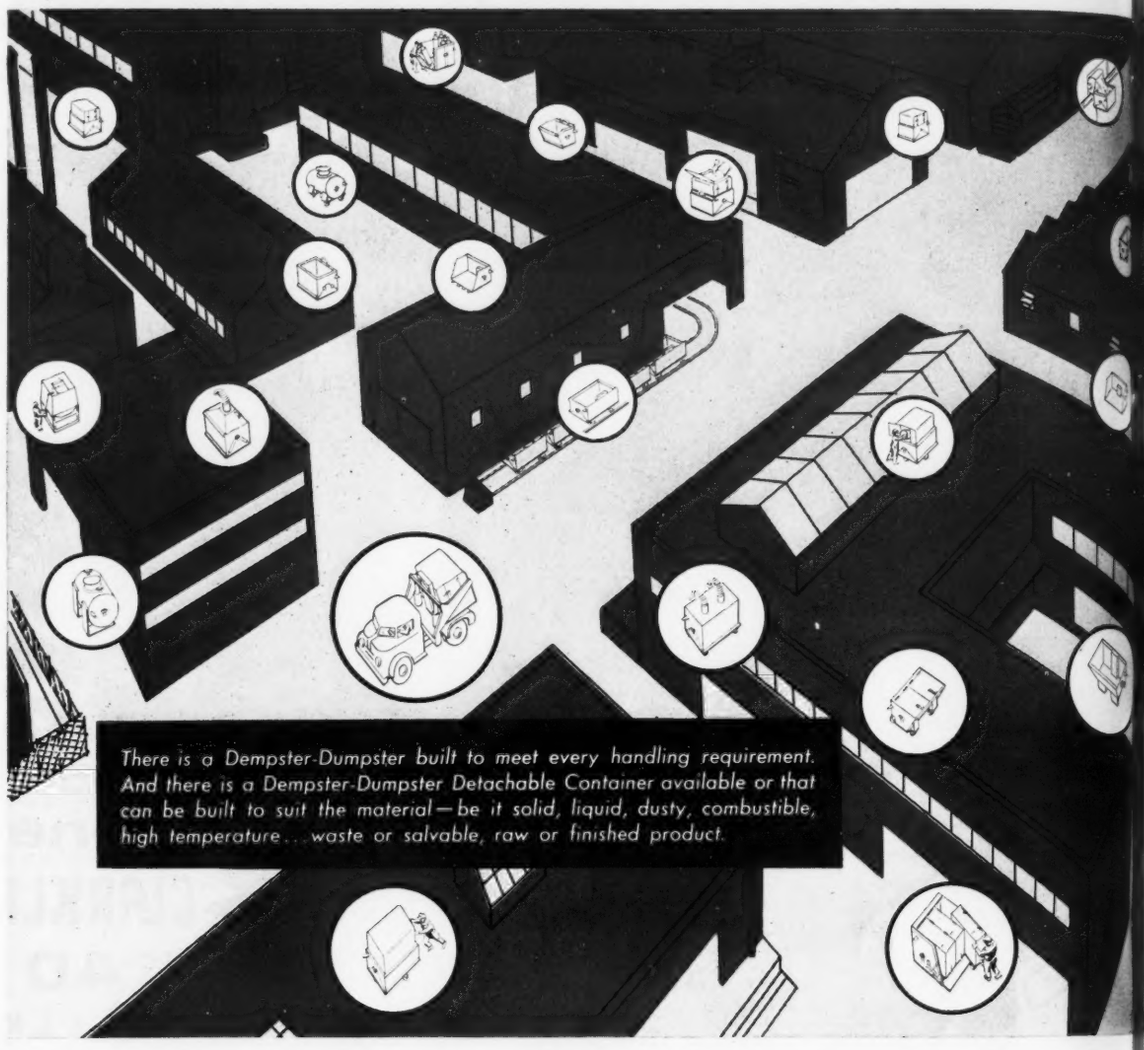


Wheel-rails slide laterally along channel members for quick changes in spacing

adjustable for easy changes of pitch and vertical spacing of rails. Unlike another model of manufacturer, latest storage rack utilizes two rails under each row of packages and operates without a divider.

Each rail has a package stop at front. Heavy construction permits widths up to 10′ without intermediate column supports. Number of rails per shelf can be changed by simply slipping in more

Who else wants to reduce materials


There is a Dempster-Dumpster built to meet every handling requirement. And there is a Dempster-Dumpster Detachable Container available or that can be built to suit the material—be it solid, liquid, dusty, combustible, high temperature... waste or salvable, raw or finished product.

With only one man, the driver, one Dempster - Dumpster serves scores of big detachable steel containers -- sizes 2 to 21 cu. yds... payloads up to 36,000 lbs!

SERVING COST-MINDED MANAGEMENT ALL OVER THE WORLD

handling cost 60% to 80% ? . . .

A FACT-FINDING SURVEY made by one of our engineers in cooperation with officials at one relatively small plant revealed labor cost of that firm's then-present-method was $6,552.00 annually. Labor cost would be $1,160.00 with the Dempster-Dumpster System — a saving of $5,392.00 annually (82 cents out of each $1.00). Investment in our equipment would amount to $10,000.00. In less than two years the equipment would pay for itself from its own savings produced for the user.

Results of a survey at a larger plant revealed annual labor cost amounted to $64,119.00, and would be $23,304.00 with the Dempster-Dumpster System — a saving of $40,815.00 (63 cents out of each $1.00). On an equipment investment of $40,968.00, the system would pay for itself in one year. In 5 years it would save this company over $200,000.00!

How much can this equipment save you? We recommend a fact-finding survey. No obligation, of course. It is the best way we have found to help you determine what can be expected of this system in your own particular operation. Or, perhaps you would prefer to first receive complete literature, free on request. May we hear from you? *Dempster Brothers, Inc.*

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers . . . All Designs . . . All Sizes

DEMPSTER BROTHERS, 237 N. Knox, Knoxville 17, Tennessee

rails, or removing or sliding to one side any unneeded rails.

(Slide-Adjust Versarack is product of M-H Standard Corporation, Dept. CP, 513-521 Communipaw Ave., Jersey City 4, N. J. . . . or for more information check 2197 on convenient Reader Service slip opposite last page.)

Allows gear changes without 'stops' . . .

torque-converter gives infinite speed ratio

Uses: Tractor-shovel is designed for bulk handling of most dry materials.

Features: Transmission design eliminates necessity of coming to a stop for a "range-shift" . . . all shifts in both forward and reverse can be made without slowing down.

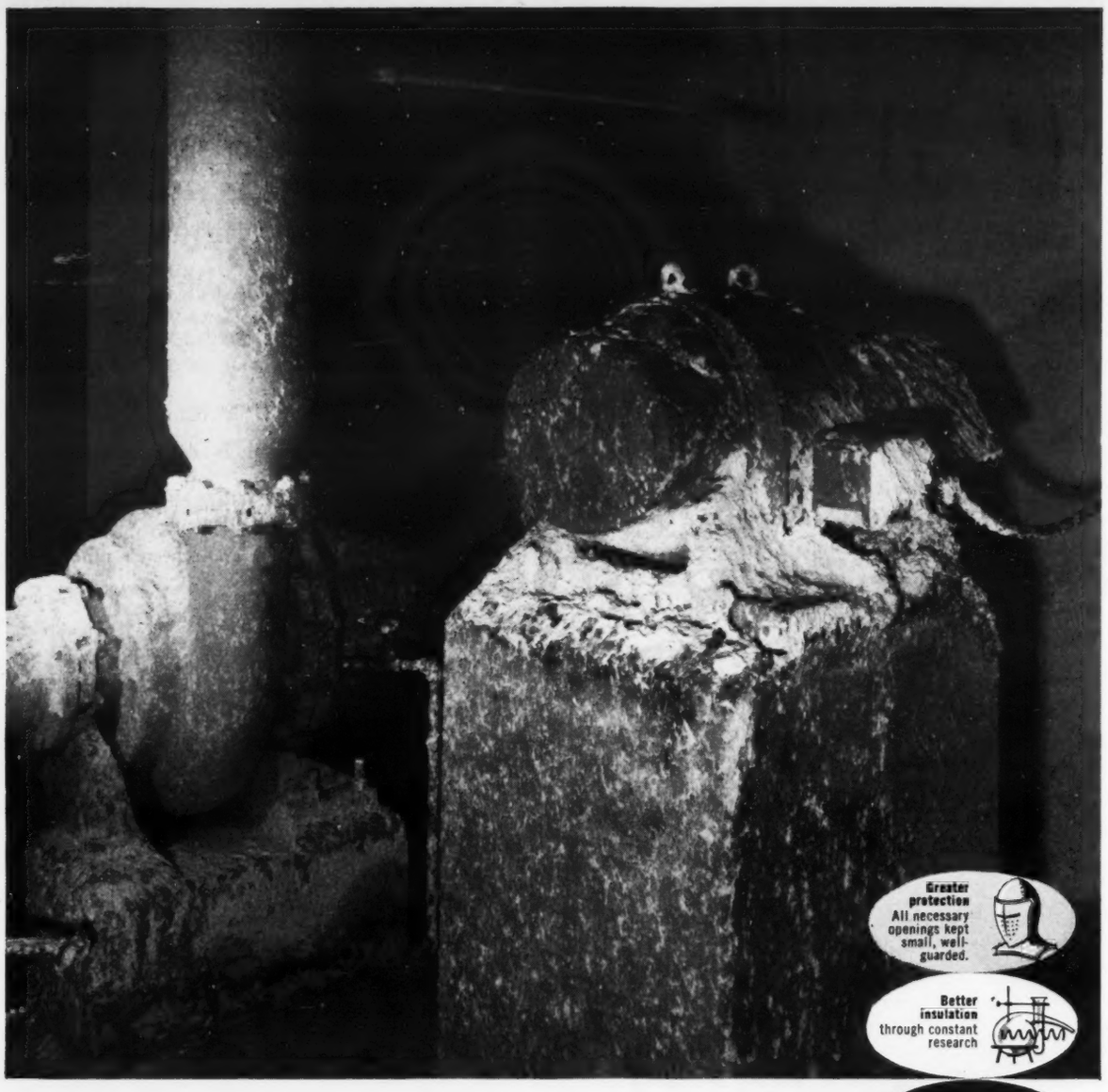
Underslung arm design eliminates safety guards

Directional control can be operated under full engine speed, in any gear. Torque-converter gives infinite speed ratio. Both transmission and torque-converter use standard SAE-10 HD oil . . . special oils are not required.

Description: Power-transfer differentials on both units provide best possible traction under all conditions by automatically transferring additional torque to the wheel with the best footing.

Boom-arm design permits "pry-out" of load and bucket action which provides 40° tip-back of load at ground level. Under-slung boom-arm design keeps moving members out of operator's reach and eliminates need for safety guards. Units are equipped with power-steering, power-brakes on all four wheels, and complete power-shift, eliminating use of clutch.

(Models HU and HH shovel-tractors are manufactured by the Frank G. Hough Co., Dept. CP, 744 Seventh Avenue, Libertyville, Ill. . . . or for more information check 2198 on form located opposite last page.)



Be glad you weren't working here...

But this sturdy Louis Allis motor was, and still is!

Shortly before this picture was taken, that pulp-mill pump suddenly ruptured. Blasted every object in the area with a thick coating of hot paper pulp.

But note the Louis Allis 20 HP splash-proof motor designed to take this kind of abuse — and come back for more! Note that it took the full force of this blast on its vented *underside* — a motor's most vulnerable point. Only a sturdy, well-designed motor could resist this. Still functioning perfectly this one didn't miss a beat!

Let us tell you more about Louis Allis electric motors. About such unique features as the new varnish of Gilsonite combined with phenolics and alkyds that provides the highest degree of moisture, acid, and alkali resistance . . . locked bearings that reduce end play and extend bearing life . . . the dynamically balanced rotor. And about the many other Louis Allis extras better discussed at length in our file-sized Reference Bulletin 1700. Why not write for it today? The Louis Allis Co., 448 East Stewart Street, Milwaukee 1, Wisconsin.

LA-111

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

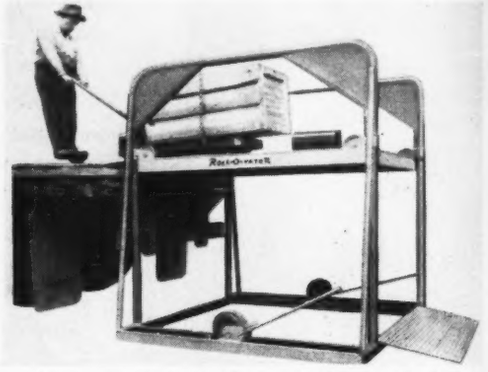
When inquiring check 2199 opposite last page

No loading dock facilities? Use mobile elevator . . .

units with capacities up to 4000 lb operate from electric outlet or gasoline engine

Uses: Designed for handling loads where dock facilities are not available.

Features: Large automatic retractable wheels permit easy maneuvering up to tailgate of truck or door of freight car.



Unit is operated like tilt-type platform truck. Push-button operates electro-hydraulic system, which can be plugged into electrical outlet — or unit can be equipped with gasoline engine

6000-lb capacity) have standard deck size of 5x6'. A 10-ft long deck is also available for the 6000-lb model. Safety-tread deck raises to 56' above ground level. Hinged floor ramp permits easy entry to deck at ground level, and hinged throw-over plate spans gap to truck or freight-car bed.

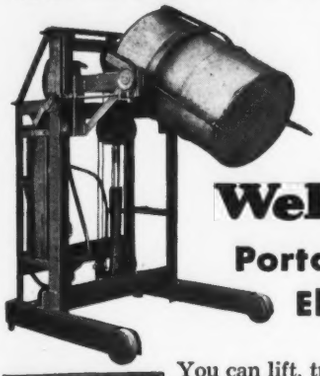
("Roll-O-Vator" mobile elevators are manufactured by Wm. Christensen Co., Inc., Dept. CP, York, Pa. . . . or for more information specify 2200 on the convenient Reader Service slip which is located opposite last page.)

Describes continuous feeders for liquids, slurries

Equipment for continuous volumetric feeding of liquids and slurries is described in four-page, two-color bulletin. Operation, versatility, and adaptability to automation are discussed. Illustrations include photographs of equipment, line drawing of typical process installation, and dimensional drawings.

Bul 65-H12B is issued by Omega Machine Company, Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence 1, R. I. When inquiring specify 2201 on form which is located opposite last page.

Simplify, Speed Up DRUM HANDLING



with New

Weld-Bilt Portable Drum Elevator

"Weld-Bilt" PRODUCTS

You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on this important time and labor-saver.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS
322 Water Street, West Bend, Wisconsin

When inquiring check 2202 opposite last page

HOW TO CUT COSTS:

Built in standard 10 ft. sections

install new **Hapman**

PAN-LINK CONVEYOR

for handling

CASTINGS, SPIRAL METAL TURNINGS, FORGINGS, HEAVY PARTS, STAMPINGS, HOT PARTS—

SIMPLER—HAS FEWER PARTS THAN ANY OTHER PAN-TYPE CONVEYOR. HEAVY-DUTY DESIGNS.

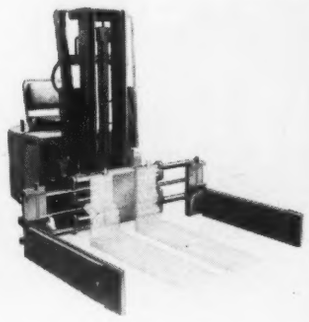
Looking for a *rugged* conveyor to cut your costs in handling heavy materials and parts—or parts to and from heat treating operations? *Pan-Link may be your answer!* Amazingly simple design eliminates ordinary chains—withstands grueling service. Many advantages.

INVESTIGATE! WRITE FOR NEW PAN-LINK BULLETIN C-37

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY
KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 2203 opposite last page

Fork-truck attachment serves as clamps or forks



Arms rotate 90° to permit operation as clamp or fork

Uses: Trucks are for palletless handling by clamping the load, or for pallet handling by using clamping arms as forks.

Features: Clamping arms rotate 90° to permit both operations.

Description: When used as clamp, maximum adjustment is 63¾" between arms, and minimum is 16".

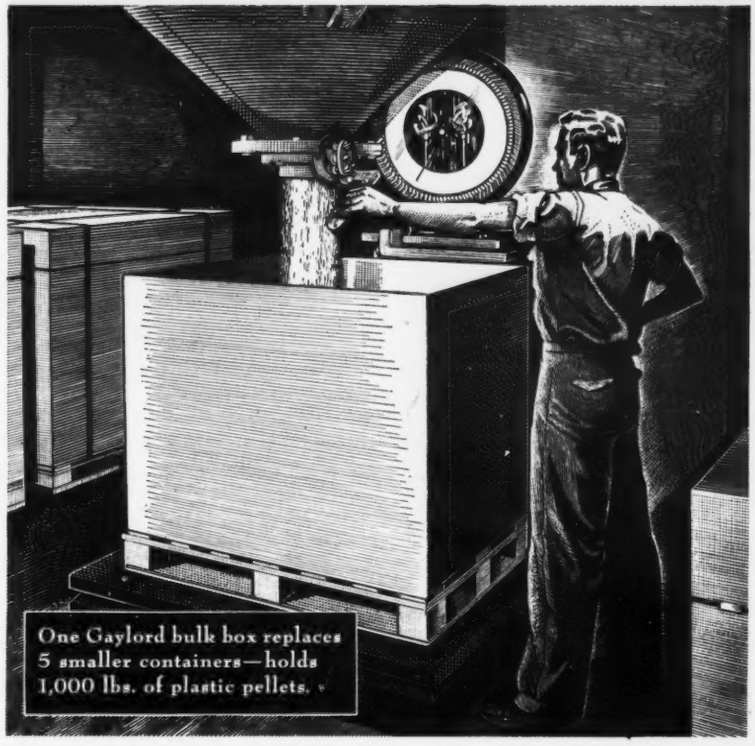
Arms are lined with rubber, and clamp is equipped with adjustable presure-relief valve to prevent crushing of loads. Controls are adjacent to operator's seat.

(Fork trucks with clamp attachment are manufactured by Lewis-Shepard Products, Inc., Dept. CP, Watertown, 72, Mass. . . . or check 2204 opp. last page.)

Office, shop, warehouse equipment listed

Manual, containing 48 pages of pictures and descriptions, lists company's line of steel equipment for offices, stores, shops, and warehouses. Equipment includes steel shelving, drawers, lockers, work benches and tables, and storage bins.

Manual References of Steel Equipment 485 is issued by EQUIPTO, Dept. CP, Aurora, Ill. Specify 2205 opp. last page.



SIMPLE ARITHMETIC IN PACKING

When one large box does the work of several smaller ones . . . it adds up to savings in many directions. You pack your product faster, handle it more efficiently and store it in less space.

"King-size" Gaylord boxes are designed to hold as much as 2,000 pounds of such diverse products as bulk chemicals, metal parts, wax, and brake linings. The list is constantly growing. Your product could be next.

For any type of corrugated or solid fibre container to make your shipping more efficient, contact your nearby Gaylord office.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

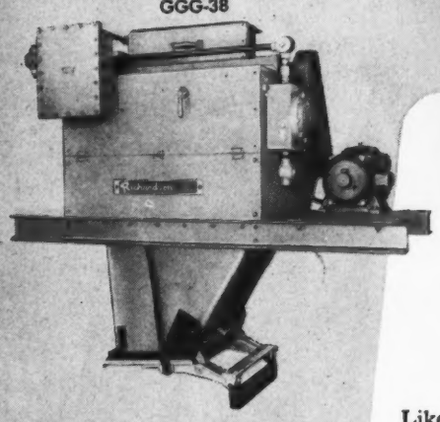
GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

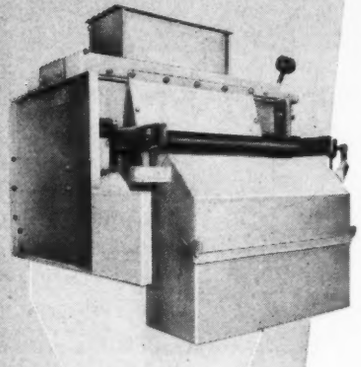
When inquiring check 2206 opposite last page

proportioning costs up?

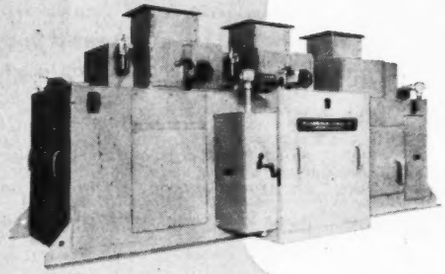
GGG-38



You can use any number of these Richardson units plus others—coupled with a Richardson Remote Stop Counter Panel—to create an automatic proportioning system for your plant or mill.



HHH-38



E-50 Triplex

Cut 'em down with the simplest, most dependable, accurate and inexpensive system you can own!

Like to switch to automatic proportioning?...or saddled with a complex, inefficient or outmoded system that isn't giving you that *extra* increment of speed and accuracy that you must have to show a real profit?

Here's the answer. By combining standard Richardson Scale batch weighing units like those shown here with a Richardson Remote Stop Counter Panel, you get virtually continuous-stream delivery, with the kind of accuracy you couldn't hope for with a continuous weighing scale. What's more, with a system made of simple, easy-to-maintain Richardson units—interlocked for simultaneous delivery—you get an inexpensive system that's tailored to fit the exact needs of your plant or mill. In many cases, depending on materials, complexity of the blend and other factors—a *simplified* Richardson Automatic Proportioning System can do the job of a much more expensive, much more complex fully-automated system.

WRITE TODAY for further information about cost-saving, space-saving, labor-saving Richardson Proportioning Systems. Ask Richardson for a recommendation to solve *your* particular problem. RICHARDSON SCALE CO., Clifton, N. J.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY, Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit • Houston • Memphis
Minneapolis • New York • Omaha • Philadelphia • Pittsburgh • San Francisco
Wichita • Montreal • Toronto • Havana • Mexico-City • San Juan
Richardson Scales S.A., 1-3 Rue de Chantepoulet, Geneva, Switzerland
Richardson Scale Co., Ltd., 40-42 George Street, Nottingham, England

Remote Stop Counter Panel

2305

When inquiring check 2207 opposite last page

Moving asbestos-cement siding panels in and out of curing autoclaves was slow. By . . .

cutting down to

Problem: Pre-curing asbestos-cement siding, a process for giving dimensionally-stable product, required some pretty tricky (but inefficient) material handling methods at The Ruberoid Company in Boundbrook, N.J. Loads of siding panels had to be moved in and out of steam autoclaves . . . and there wasn't enough clearance to admit an ordinary fork or platform truck.

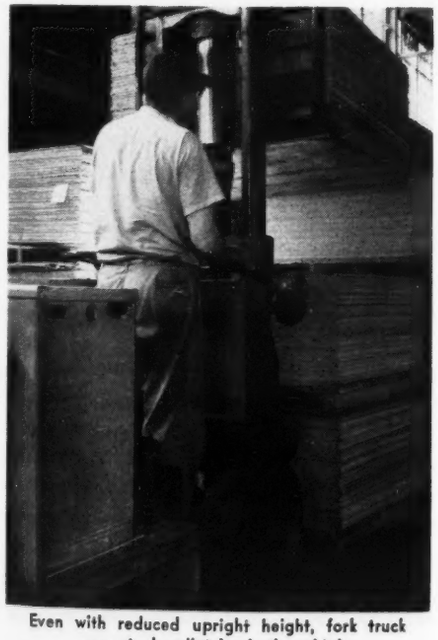
Procedure was to bring pallet loads by fork truck to the autoclave, then transfer the siding by overhead crane to hand trucks. At least two men were required, full time, to assist in this transfer work and to push hand trucks in and out of the autoclaves. In addition, the men could not work steadily in the autoclaves because of the heat retained between cycles.

Solution: Electric fork truck, standup model with 6000-lb capacity, was modified to permit operation in and out of autoclaves with proper clearance. Upright height was cut, cowl and steering wheel were lowered, and frame was cut out to permit lowering of foot controls. Use of smaller battery gave room for mounting seat 27¼" off the ground. Free lift is 81", allowing truck to stack pallets outside the autoclave.

(*Please turn to page* 102)

Normally, fork truck operator stands up to drive truck, but seat permits him to operate comfortably inside autoclaves

electric fork truck size... job has been speeded up, increasing capacities and reducing manpower



Even with reduced upright height, fork truck can stack pallet loads three-high

CRANE HOOK
6,700-lb capacity
Maximum height (hook to ground), 12'8"

WATCH THIS TRACTOR BECOME A FLEET

...and your material handling problems become a breeze

With an Allis-Chalmers HD-6G tractor shovel, you simply remove and replace four pins to change from a bulk loader to a lift fork, crane, bulldozer or ditcher. The switch takes two men less than 15 minutes, yet each new attachment can save many hours of hard labor.

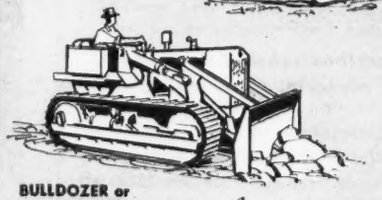
With its standard 1½-yd bucket, you can stockpile, reclaim and load bulk materials of all kinds. Or you can double your speed in coal, coke, cinders and snow with a big 2¼-yd light materials bucket.

Then, by changing from one attachment to another, you handle packaged and palletized loads, move heavy machinery, level yard storage areas, maintain plant roads, landscape, dig trenches for pipe and foundation footings, handle countless other jobs—all on one basic equipment investment.

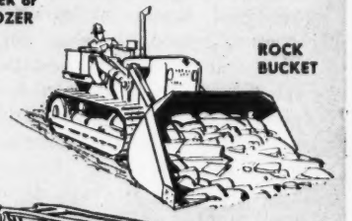
Ask your Allis-Chalmers dealer to show you how its unmatched versatility can streamline many jobs in and around the plant. Write for free literature.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

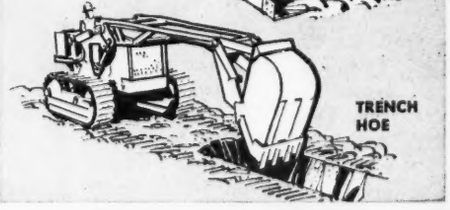
LIFT FORK
Stacking height, 9'10"
Available with fixed or adjustable tine spacing



BULLDOZER or ANGLEDOZER BLADES



ROCK BUCKET



TRENCH HOE

ALLIS-CHALMERS

When inquiring check 2208 opposite last page

Modified Fork Truck

(*Continued from page* 100)

Results: With this truck one operator can unload and reload an autoclave in about two-fifths the time previously required, can keep up with handling all autoclaves, and frequently has time to help out with material handling elsewhere in the plant. Heat is no longer a problem to the operator since his time in the autoclave is reduced substantially.

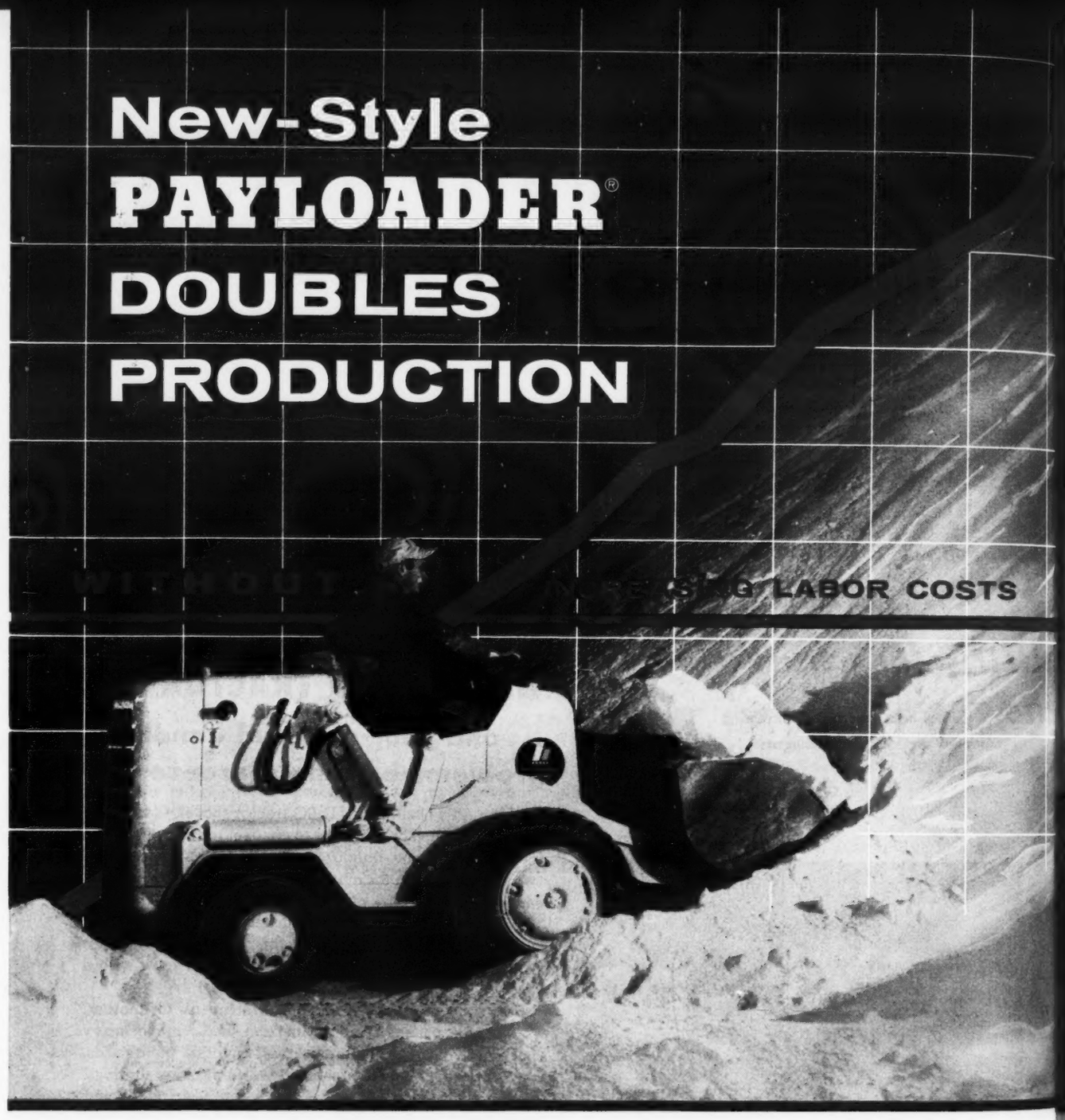
Thus, requirements have been cut from a minimum of two men, full time, plus a fork truck and crane with their operators, part time, to one man and one fork truck. Daily capacity of autoclaves has been increased since less time is wasted between cycles. In addition, faster loading and unloading of autoclaves has resulted in less cooling off between cycles, giving a gain in fuel economy.

(Low-silhouette fork truck is manufactured by Baker Industrial Truck Division, Baker-Raulang Co., Dept. CP, 1250 W. 80th St., Cleveland 2, Ohio. . . . or for more information check 2209 on convenient Reader Service slip opposite last page.)

Describes sensing devices for material flow, level

Described in two-page brochure are three automatic devices that can indicate lack of material supply or flow in chutes, conveyors, bins, hoppers and silos. Schematics show installation and mounting of material level control, blade no-flow alarm, and paddle no-flow alarm. Devices give warning by bell, horn, and light.

Technical Reference 55D is issued by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. When inquiring reader may simply specify 2210 on form which is located opposite last page.



How to keep up with production demand yet hold down production costs in the face of more competitive markets, tighter labor supplies and rising labor costs? . . . One proven solution is to increase output per man by providing your operators with the most modern, most productive machines available. In the field of bulk or loose materials handling, the answer is "PAYLOADER" tractor-shovels. They are built by the pioneer and leader in the tractor-shovel industry and there are *more* "PAYLOADER" units in use than all other makes combined. Industrial plants that have been "PAYLOADER" users for years tell us that it has paid them well to replace older units with the new, more productive "PAYLOADER" models . . . that they not only handle more tonnage than earlier models, but are also way ahead of other tractor-shovels in design and in the features that make them MORE PRODUCTIVE. There is a size and type to meet every need.

• MORE TONS per man hour

DIGS MORE

The new-model HA "PAYLOADER" is especially designed for fast, low-cost materials handling — indoors and outdoors. Rear-wheel-steer and compact design makes it easy to maneuver in close quarters. The distinctive bucket action with powerful, 40° break-out and tip-back at ground level digs heaping loads quickly.

CARRIES MORE

Heaped loads are cradled close and low for greater stability while carrying. Hydraulic system load-shock-absorber cushions the load, smooths the ride and permits faster movement with less spillage and greater safety. Torque converter drive makes for smooth, fast starts, quick maneuvering and easier control.

DELIVERS MORE

It's the tonnage delivered per hour that counts. Since you get MORE load to begin with, and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result is you *deliver* more tons per load and more loads per man-hour, hour after hour and day after day.

Better Engineered for Better Performance

Shortest Turning Radius — The model HA can work where others can't because it has a shorter turning radius than any comparable tractor-shovel — goes through doorways and spaces less than 4½ feet wide — easily turns corners of 6 foot aisles.

Higher Dumping Height — The model HA can deliver its loads over bin and hopper edges up to 6½ feet high. Loads can be dumped as fast or slow as desired at any height.

Biggest Capacity — With a bucket capacity of 18 cubic feet payload, and 14 cubic feet struck, the model HA has a carrying capacity up to 25 percent greater than comparative machines—and more than some bigger, heavier machines.

Easiest Operating — The entire hydraulic control of the model HA bucket — tip-back, raise, dump and lower — is handled by a single conveniently located lever. It's the simplest, easiest bucket control available.

WANT PROOF? If you are using a "PAYLOADER" that is more than 2 years old, ask your "PAYLOADER" distributor for a demonstration of the latest model, and see how much more work your operator can turn out — and how much more than with any other comparable size machine. Call him today.

SAY "HUFF"

PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

Send full data on "PAYLOADER" tractor-shovels as follows:

- ☐ Front-wheel-drive models HA (18 cu. ft.) and HAH (1 cu. yd.)
- ☐ Larger models (including 4-wheel drives up to 2¼ cu. yd.)

Name _____

Title _____

Company _____

Street _____

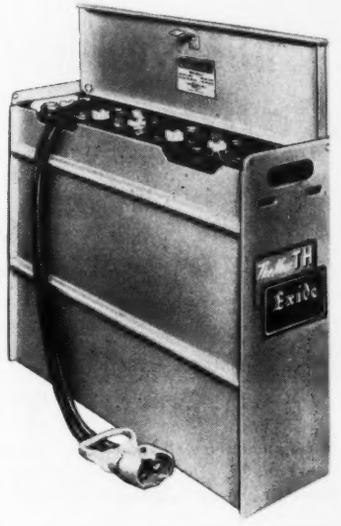
City _____ State _____

43

Conforms to Association standards, hinged at front or back

Uses: Battery trays containing manufacturer's industrial batteries are for use on all operator-led industrial trucks.

Features: Trays conform to dimensions and practices recently adopted by Industrial Truck Association. Classified according to ITA hand truck battery groups one through nine, they range in width from 6⅝ to 18¼".



Battery trays conform to standards set by Industrial Truck Assn.

Description: Tray cover is constructed of steel and hinges so that it opens flush with vertical plane of the back. Batteries may be installed back-to-back in minimum space without interfering with opening of covers. Covers can be hinged either at front or back of tray. Tray provides for battery ventilation and clean truck operation.

Drainage holes at ends are ¼" lower than cable and grip openings on sides — dirt, acid, or

(*Please turn to next page*)

For more information on product at left, specify 2211 . . . see information request blank opposite last page.

(*Continued from preceding page*)

water spilled on top of battery drains where cleaning is easy.

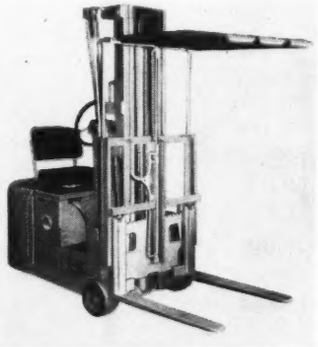
Trays are available for manufacturer's 12, 18, and 24-volt hand truck batteries.

(Trays, used on manufacturer's batteries are products of Exide Industrial Division, The Electric Storage Battery Co., Dept. CP, Philadelphia, Pa. Check 2213 opposite last page.)

Loose loads are steady when fork truck has a stabilizer

Uses: Handling loads of case goods that cannot be nested or tied together.

Features: Stabilizer consists of three sponge-rubber-lined pads mounted on pivots to accommodate objects of different heights. This eliminates shifting if one case should be higher than the others on the pallet.

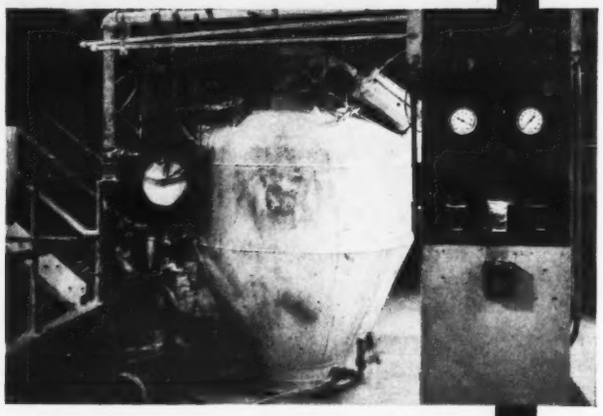


Operator does not leave truck to raise or lower load stabilizer

Description: Sponge-rubber lining is faced with neoprene. Stabilizer has vertical stroke of 24", opening from minimum height of 40" above fork to maximum of 64". Clamping area is 34" square, with each rubber pad 32½" long by 8½" wide.

(Load stabilizer is manufactured by Lewis-Shepard Products, Inc., Dept. CP, 125 Walnut St., Watertown 72, Mass. Check 2214 opposite last page.)

Difficult Bulk Handling Job



...but well-handled by the Robinson Air-Activated Conveyor

Product... abrasive chemical, ¼" to fine dust
Temperature... 600° F.

This Robinson Air-Activated Conveyor is installed in the plant of a well-known chemical company where it is conveying the hot chemical noted above . . . a job on which other means of handling, including pneumatic, either failed or proved inadequate.

Robinson operations can be made fully automatic and closely controlled by precise instrumentation.

The Robinson System—completely pneumatic, with gravity feed—offers several outstanding advantages for handling fine granular or dry powdered materials into, through and from the plant.

1 . . . products are handled gently; the mixture is 'fluidized'; particles are floated rather than blasted through the conveyor.

2 . . . only low volume of air is required; the average is less than 1 cubic foot of free air per pound of material conveyed.

3 . . . maintenance costs are exceptionally low; no moving parts such as motors, screws, shafts and bearings to require maintenance.

The Robinson Air-Activated Conveyor may be just what you need for pneumatically handling the materials at your plant. Investigate its possibilities. We can point to many successful installations. Write us in detail about your problem.

ROBINSON Air-Activated CONVEYOR SYSTEMS
A Division of Morse Boulger Destructor Co.
DEPARTMENT T, 80 FIFTH AVENUE • NEW YORK 11, N. Y.
Representatives in Principal Cities

When inquiring check 2212 opposite last page

PUMP
Liquids • Gases • Slurries
WITHOUT CORROSION OR CONTAMINATION

Prices range from ..... $55 to $500 depending on size of pump and accessory equipment required.

Write for Catalog

SIGMAMOTOR Inc.
18 North Main Street • Middleport, N. Y.

When inquiring check 2215 opposite last page

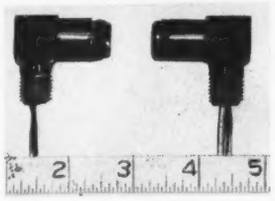
alphabetical index on page 221

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 221. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Miniaturized electric eyes serve where space is problem . . .

units are small enough to fit in the palm of hand

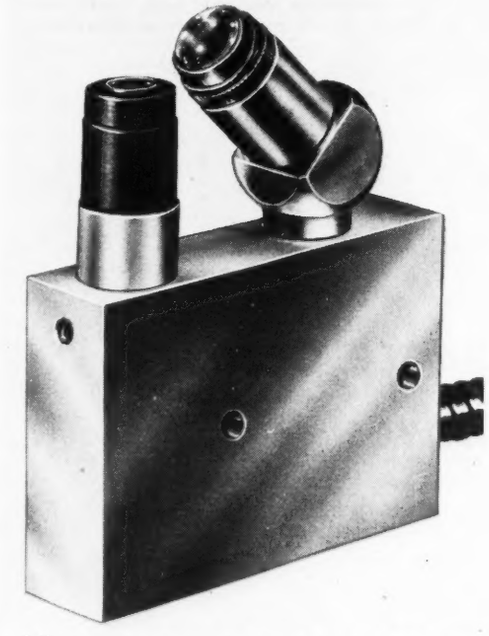
Uses: Have applications in counting, positioning, monitoring, and sequencing operations where space is a problem.



Pick-up units are provided with 1/4" standard pipe threads for mounting

Features: Small pickup units measure 1½ x 1-5/16 x 11/16". Self contained unit of reflecting type is designed for extremely close registration.

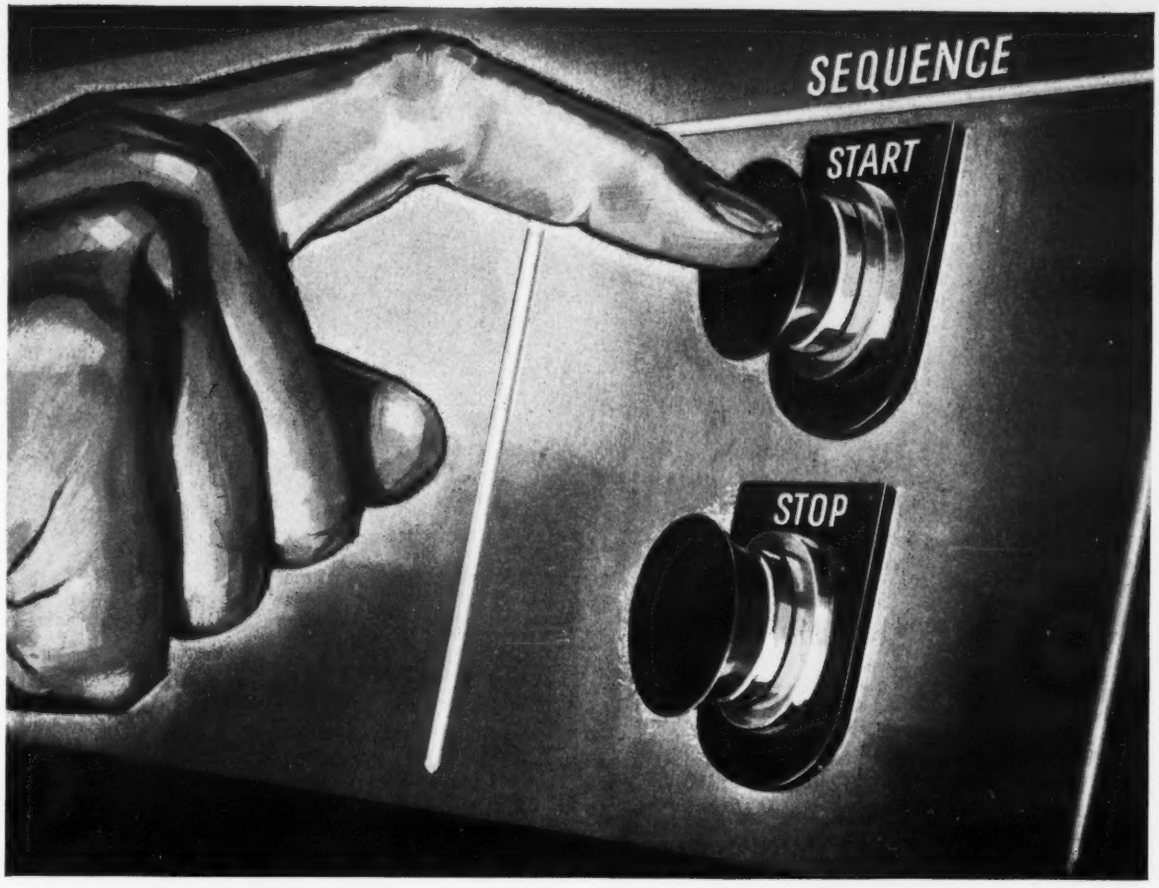
Description: Units can be arranged to operate relays by the absence of light, or its presence, on photocells. Relay box contains power relay and associated electronic equipment. With "sensitivity" and "light" adjustments, relay may be set to operate



Self-contained unit can be targeted to operate on very fine line or sharp edge of color variation

at any desired threshold of light. Both lead sulfide and cadmium sulfide photocells are used to meet various conditions.

(Miniaturized electric eyes are manufactured by Dept. D, EES Instrument Co., Dept. CP, Bergenfield, N.J. . . . or for more information check 2216 on form opposite last page.)



Got a job for the Batchetron?

Here's what it will do. Operating electronically from a remote control station, the Fairbanks-Morse Batchetron can be preset with knobs and buttons to assemble accurate quantities of dry and liquid components from any one or more bins or tanks. The cycle of mix is also preset, and the actual batching takes place at the touch of a button.

Which of these features will improve your batching operation? Do you want remote control—for instance, batching from an air-conditioned office? Do you want the fast programming feature—for the occasional single batch from a different formula? Do you want the automatic cycling—that will duplicate the batch again and again at the touch of a button?

The Batchetron is . . . Fairbanks-Morse electronics instrumentation plus accurate weighing in the Fairbanks-Morse tradition. There is a new bulletin, No. ED-14, on the Batchetron with many suggested applications which may fit your process operations. Send for it today. Fairbanks, Morse & Co., Dept. CP-3 600 South Michigan Ave., Chicago 5, Illinois.

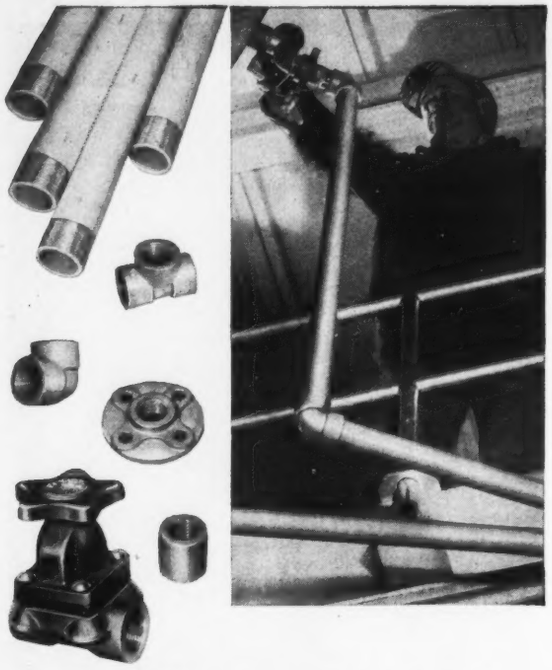
Batchetron control console.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

When inquiring check 2217 opposite last page



Peak Performance by

Van-Cor

PIPING

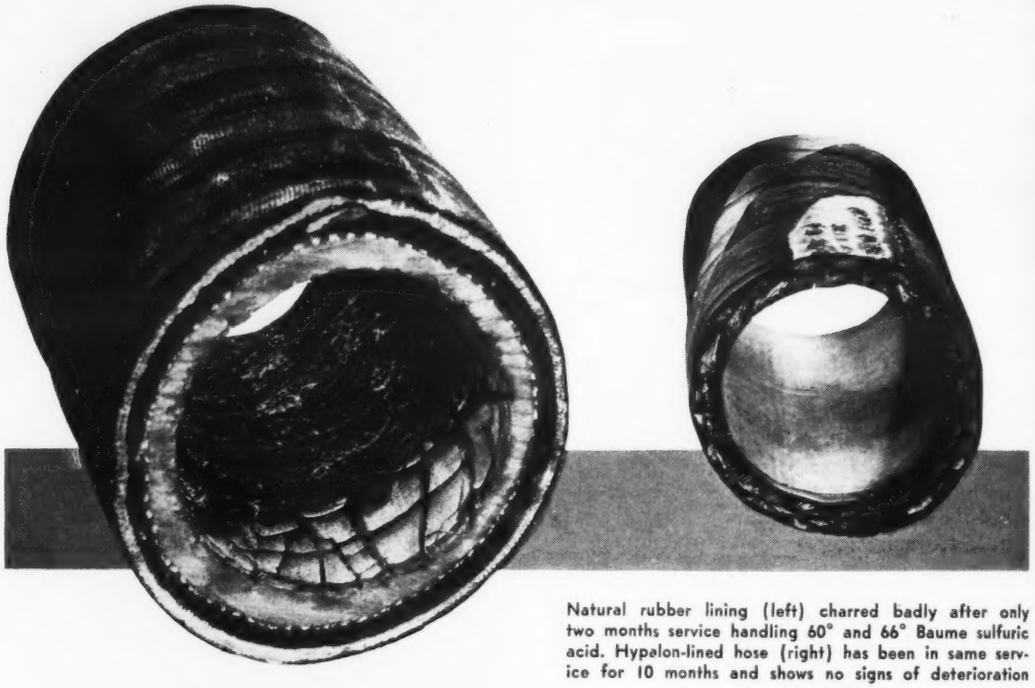
An Ohio plant was faced with high pipe maintenance costs because the acetic acid produced is strong enough to eat holes in steel. Instead they installed Van-Cor plastic piping that is still good as new after 18 months' service.

Van-Cor pipe, fittings and valves have solved similar problems with scores of corrosive chemicals. An unplasticized polyvinyl chloride, Van-Cor weighs less, and is easier to install, than conventional piping. It serves longer, thus costs far less . . . Van-Cor sheets are also fabricated into ducts, hoods, tanks, fumestacks, etc.

INVESTIGATE!
Write for Bulletin, Specifications and Name of Nearest Distributor.

INDUSTRIAL DIVISION OF
COLONIAL PLASTICS MFG. CO.
SUBSIDIARY OF THE VAN DORN IRON WORKS CO.
2685 EAST 79th STREET • CLEVELAND 4, OHIO

When inquiring check 2218 opposite last page



Natural rubber lining (left) charred badly after only two months service handling 60° and 66° Baume sulfuric acid. Hypalon-lined hose (right) has been in same service for 10 months and shows no signs of deterioration

Because natural rubber lining failed frequently on hoses used to unload sulfuric from tank trucks, Rogers Cartage evaluated a synthetic rubber lining. As a result . . .

acid hose maintenance drops, safety improves

Problem: Natural rubber was unsatisfactory in handling 60° and 66° Baume sulfuric acid at Rogers Cartage Co., South Chicago, Ill. After only two months service, lining was charred beyond use and potentially dangerous. Weakened hose if left in service could split or break, spraying personnel and equipment with acid.

Company hauls tank truck quantities of sulfuric acid. Hose was used to carry acid from trucks to customer's storage facilities.

Several trucks were equipped with steel pipe and swing-joint connectors in an attempt to reduce maintenance costs and eliminate the potential hazard of weakened hose. This rig proved costly to install and was extremely cumbersome for driver to handle when making deliveries. In addition, only a two-inch line was practical with existing connections, so that discharge speed was reduced. This meant more time was needed for each delivery.

Solution: Rogers evaluated an acid hose having a lining of Hypalon synthetic rubber. Rubber is

Three-inch diameter, eight-foot acid lines with a chlorosulfonated polyethylene lining have helped reduce injuries by over one half in Chemical Division of Rogers Cartage Co.

chlorosulfonated polyethylene. It is made by reacting polyethylene with chlorine and sulfur dioxide to produce a vulcanizable rubber.

As a result of the evaluation company decided to equip truck fleet with these hoses. Three-inch diameter, eight-foot lengths were used. Each end is fitted with a 125-pound standard four-bolt flange. Air pressure, at 30 psi, is used for unloading.

Varied Advantages

Results: There has been no deterioration or failure of hoses. Costly frequent replacement that was necessary with former hoses has been eliminated. Flexibility of new units makes handling easy. Large diameter assures fast unloading. Examination after 10 months showed that lining was in perfect condition. Because of rubber's excellent resistance to sulfuric acid, company installed gaskets of same material on dome and sump of trucks. Safety record has shown a marked improvement since adoption of Hypalon-lined hoses and gaskets. Injuries have been reduced by more than half in chemical division.

(Hypalon synthetic rubber is a product of Elastomer Chemicals Dept., E. I. du Pont de Nemours & Co., Dept. CP, Wilmington 98, Del. . . . or for more information reader may simply check 2219 on the convenient Reader Service slip which is located opposite last page.)

FEUTRON*

The Felts of the Future that are here today!

Eliminate virtually all problems encountered with conventional materials in 3 major reinforced plastic fields and are ideal for filtration, high temperature bearing seals, gasketing. The new **FEUTRON** mechanically interlocked felts, recently developed by American Felt Company, are of 100% synthetic fiber construction. Although particularly suited to the reinforced plastic (low pressure) field their uses are practically unlimited.

The three reinforced plastic fields in which **FEUTRON** felts are especially suited: electrical and electronic equipment, as overlays in fiberglas mat reinforced bodies, where chemical or corrosion resistance is necessary.

FEUTRON FACTS

1. **Exceptional chemical resistance with thermal stability to 300F.**
2. **Non-hygroscopic and biologically stable.**
3. **Produces a smooth, fiber-free surface in finished product.**
4. **Three dimensional strength properties.**
5. **Excellent uniformity of weight and thickness.**
6. **Good draping and tailoring properties.**
7. **Good resin pickup (wettability) due to large amount of fiber surface available.**
8. **Good resin-to-fiber adhesion.**
9. **High strength and elongation properties which may eliminate the need for pre-forming in deep draw applications, and prevent tearing in vari-shaped molded applications.**
10. **Excellent dielectrical properties.**

FEUTRON FELTS are available in **DACRON**** . . . **ACRILAN***** . . . **ORLON**† . . . **DYNEL**†† . . . **NYLON** . . . **ARNEL**††† . . . **VINYON**‡ . . . **VICARA**‡‡

Investigate **FEUTRON** felts further, by sending for Technical Bulletin, making request on your firm's letterhead. *©American Felt Company 1957

**DuPont trademark for its polyester fiber
***Acrylic fiber by Chemstrand
†DuPont trademark for its acrylic fiber
††Union Carbide's acrylic fiber
†††Celanese Corp. trademark for its tri-acetate fiber
‡Union Carbide's Copolymer of polyvinyl acetate and polyvinyl chloride
‡‡Virginia Carolina Chemical Co. Zein Protein Fiber

American Felt Company

TRADE MARK

GENERAL OFFICES: 96 GLENVILLE ROAD, GLENVILLE, CONNECTICUT

SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Greenville, S. C., Dallas, Boynton Beach, Fla.; San Francisco, Los Angeles, Portland, San Diego, Seattle, Montreal.—**PLANTS:** Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—**ENGINEERING AND RESEARCH LABORATORIES:** Glenville, Conn.

When inquiring check 2220 opposite last page

Stainless float valve designed for control of corrosives

Uses: Applications include use in the oil, chemical, textile, and paper industries, as well as other companies where piping systems handle corrosives.

Features: Mechanical float valves are fabricated from 316 and 317 stainless steel. Sealing cup around plunger is Teflon.

Simplifies control of corrosives

Description: Float valves are available with threaded or socket welding ends. Adjustable arm assembly simplfies control of fluid level. Disc is neoprene, Hycar, Teflon or other materials to suit particular conditions.

(Fig 1350 series stainless float valve is product of Robert Mfg. Co., Div. Hartwell Co., Dept. CP, 9035 Venice Blvd., Los Angeles 34, Calif. Check 2221 opposite last page.)

Tape protective coating has self-disposing film liner

Uses: For protection of pipe and other equipment.

Features: Film-type liner, which permits easier and faster handling in the field, is disposed of automatically in torching application process.

Description: Tape is a coal-tar coating with a tar-saturated, close-woven fabric as a carrier. It it resistant to moisture, chemicals, and abrasive conditions. Tape comes in widths from 2 to 6".

(Tape is product of The Tapecoat Co., Dept. CP, 1523 Lyons St., Evanston, Ill. . . . or for more information check 2222 on form opposite last page.)

"No other metal will do
as well as Stainless

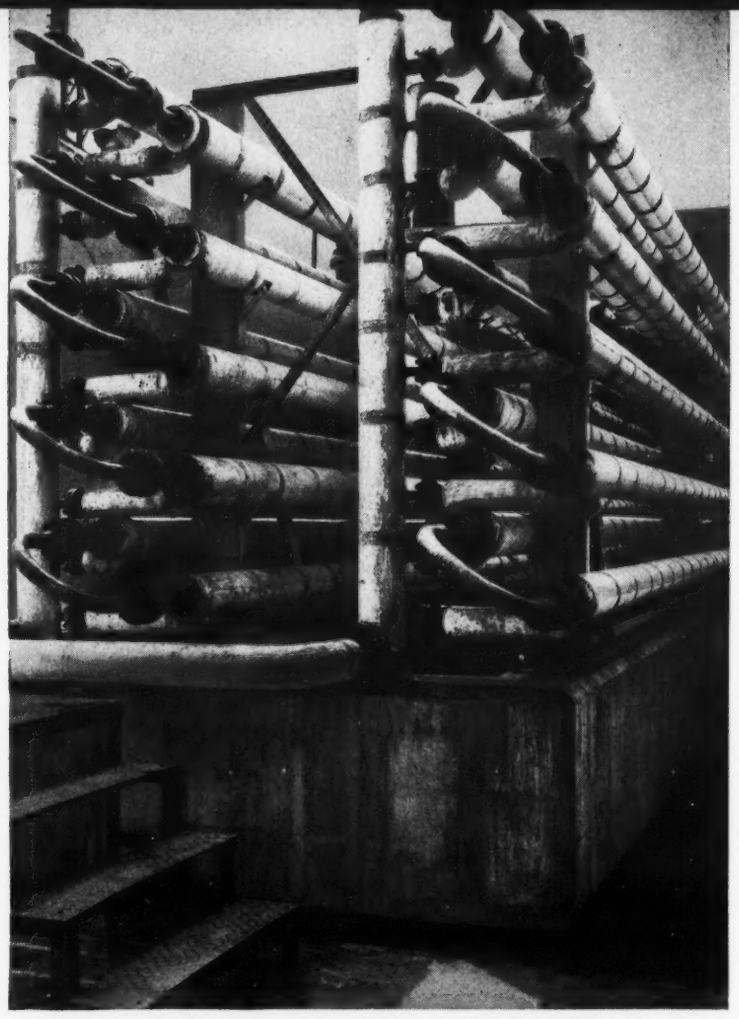
Autoclave has Stainless lining, impellers and shafts.

lo the job

ss Steel"

...says

WHITAKER METALS CORPORATION
NORTH KANSAS CITY, MO.



Stainless Steel tubing is used to preheat ammonium carbonate solution.

About two years ago, in a new 1½ million dollar plant, Whitaker Metals Corporation began a unique operation of leaching copper out of scrap metal of high copper content. It's strictly a chemical process, and large amounts of ammonium carbonate must be pumped and stored.

Stainless Steel is the only practical metal for this type of service, and you'll find it in hundreds of locations throughout the plant. Primarily, the Stainless is used for strength and corrosion resistance. Most vessels, pumps and pipelines are made from Stainless—as well as the centrifuge delivery screens. Here, they found that Stainless screens were much easier to clean than other types, because they retain their surface density and smoothness.

Wisely, Whitaker designed with Stainless right from the start, so they were spared the cost of trial and error replacement. This is a good plan for any chemical plant design, because it insures that you will get maximum return on your Stainless Steel investment. For service-tested quality, you should specify *USS* Stainless Steel.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL

Materials and methods for tank lining lower costs . . .

synthetic rubber has better chemical resistance

A ready-cured synthetic rubber lining material has been developed which offers the advantages of superior over-all chemical resistance and economy over natural rubber. It is offered as part of a package consisting of primers and adhesives for adhering to supporting metal tanks, an adhesive for strapping seams, and a putty for filleting joints and corners.

Since material is ready-cured, necessity of curing in the field is eliminated. It is stable in storage and requires no refrigeration. The synthetic rubber is available in two-ply, 50" width at ⅛" thickness. Applied cost per square foot has proved to be appreciably lower than natural rubber and other materials now in use.

(Fairprene T-5594 synthetic rubber tank lining package is product of Fabrics Div., E.I. du Pont de Nemours & Co., Wilmington, Del. Check 2223 opp. last page).

Shows PVC valves for corrosion service

Globe and needle PVC valves, designed to meet requirements of fluid systems where corrosion problems exist, are illustrated and described in four-page catalog. Construction and operating advantages are pointed out, and uses are listed.

Cat C1056 is issued by Chemtrol Corp., Dept. CP, 1513 W. El Segundo Blvd., Compton, Calif. When inquiring specify 2224 opp. last page.

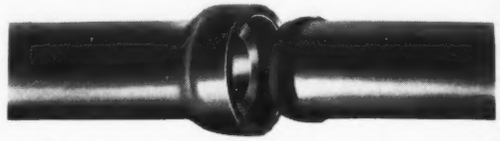
For more information on product at left, specify 2225 . . . see information request blank opposite last page.

Root-resistant, waterproof flexible union furnished for clay sewer pipe . . .

polyvinyl chloride coupling permits tight joint to be made quickly

Uses: For permanently jointing clay sewer pipes.

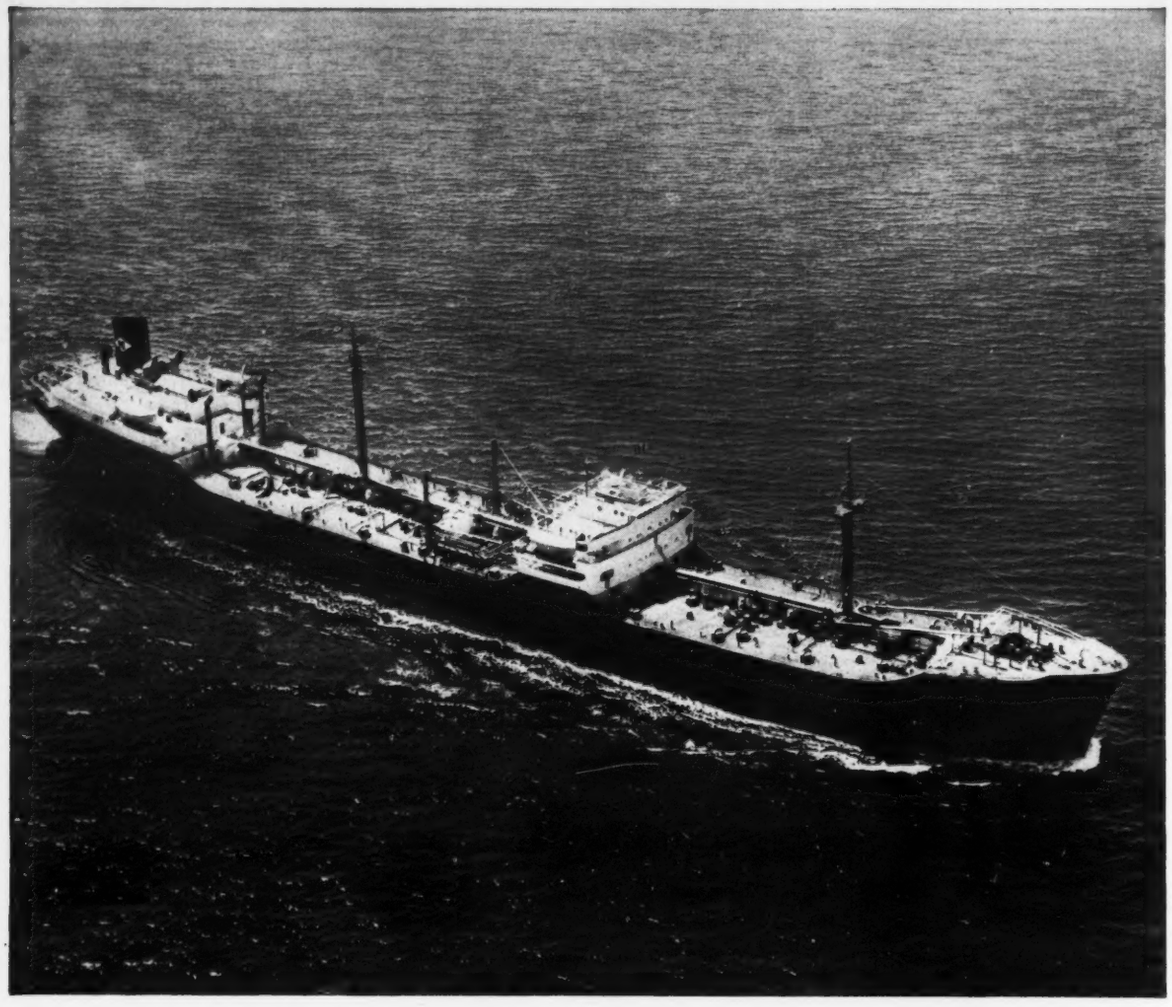
Features: Polyvinyl chloride was selected for the coupling because it is resistant to the acids, bases, solvents, gases, and greases normally found in industrial sewage. It provides a tough but flexible joint.



PVC pipe joint resists corrosives normally found in industrial wastes

Description: Coupling consists of rings, precision molded and fused on the spigot and in the bell of pipes. Polyvinyl chloride is applied to hot pipe in liquid form and is cured at high temperatures. It bonds tightly with the glazed surface of the pipe. Joint is made by applying sealer to mating surfaces of coupling and pushing spigot firmly into bell socket. Coupling is a compression-type joint. This contributes much to the tightness of the joint. In recent tests no evidence of leakage was noted in any of the pipe joints subjected to hydrostatic pressure.

(PVC coupling is product of W. S. Dickey Clay Mfg. Co., Dept. CP, PO Box 228, Kansas City 42, Mo. Check 2227 opposite last page.)



Smooth Sailing for Hot Caustic

. . . in tanks of economical Lukens Nickel-Clad Steel

This is the *Marine Dow-Chem*—first ocean-going tanker designed from the keel up solely to transport chemicals. Her four aft tanks carry high quality, 73% caustic soda—heated to 230 degrees F.

Ship and shore storage tanks were fabricated "in the field" of Lukens clad steel—.055" nickel cladding on strong, economical carbon steel backing. Choice of nickel-clad steel saved 55% in materials cost—and recent inspection showed no corrosion after three years of trouble-free service.

Lukens clad steels, from 3/16" gage up, have proved their worth throughout the chemical industry. Only Lukens makes available a choice of 16 cladding and 11 backing metals to meet virtually any tank or pressure vessel requirement. *Consult your equipment builders or write for new technical booklet, "Clad Steel Equipment." Address Manager, Marketing Service, Room 896. Lukens Steel Company, Coatesville, Pennsylvania.*

LUKENS (R)

This is Lukens clad steel, a proven product. Not a lining, not a soldered-on surface, but a solid plate—one side corrosion resistant nickel or high alloy; the other rugged, economical carbon or alloy steel. The permanent metallurgical bond is produced by heat and pressure on the powerful rolling mills of Lukens Steel Company.

Helping industry choose steels that fit the job

When inquiring check 2226 opposite last page

"We had to hire a professor of hieroglyphics to decipher his notes."

Chemical resistance better with films of polyethylene . . .

have higher heat resistance, lower gas permeability

Uses: For wire and cable insulation, vacuum forming, chemical and industrial packaging and other polyethylene film applications.

Features: Films offer the physical and chemical properties inherent to polyethylene with the additional characteristics of greater heat resistance, lower gas permeability and improved chemical resistance.

Description: Series of calendered polyethylene films are of the low pressure or linear type. Films are available in gages ranging from 0.004 to 0.025" and widths up to 32". Present films are limited to natural and black containing 100% linear polyethylene as well as blends of this material with regular polyethylenes.

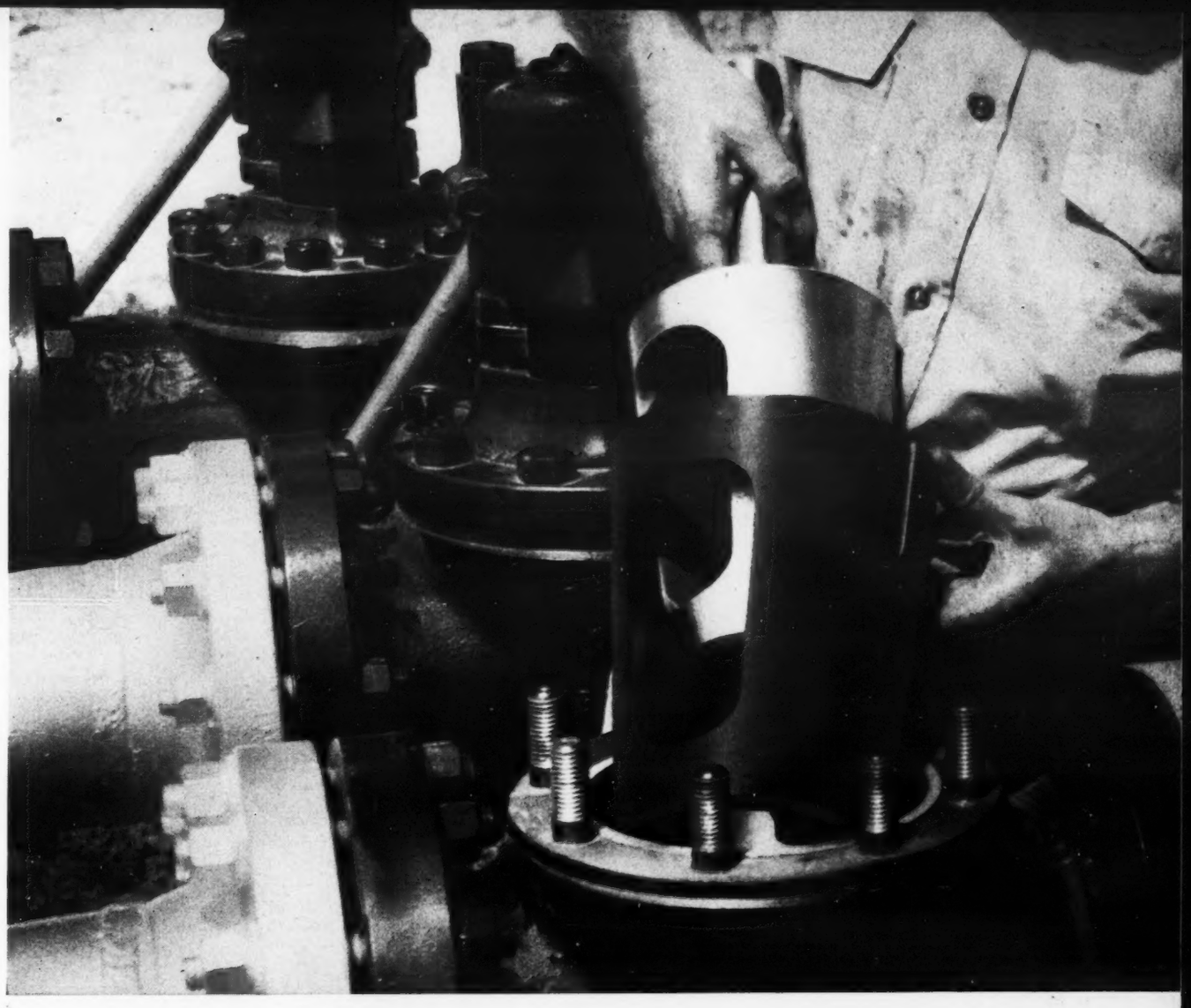
(Polyethylene films are product of the Plastic Film Dept., The Kendall Co., 309 W. Jackson Blvd., Chicago 6, Ill. . . . or for more information check 2228 on form opposite last page.)

Data presented on tantalum

Engineering information and typical examples of tantalum equipment for processing corrosives are given in 12-page bulletin. Condensers and heat transfer equipment are shown and described. Dimensions are included for all equipment.

Bul 3.506 is issued by Fansteel Metallurgical Corp., Dept. CP, North Chicago, Ill. When inquiring specify 2229 on the convenient Reader Service slip opposite last page.

For more information on product at right, specify 2230 . . . see information request blank opposite last page.



LPG--NO LONGER A PROBLEM

CAMERON LIFT-PLUG VALVE WITH HYCAR IS THE ANSWER

More and more operators every month are spending time on something beside valve maintenance and repair. The Cameron Non-Lubricated Lift-Plug Valve fitted with a Hycar nitrile rubber-coated seat is doing the job on three counts:

1. HOLDS LIGHT HYDROCARBONS – A SHUT-OFF SHOULD BE A SHUT-OFF (Seal-Tight, Jug-Tight, Bubble-Tight).

2. NON-LUBRICATED—Let's face it, LPG Valves are either valves or a specialized maintenance program. The Cameron Hycar Lift-Plug needs no grease guns – no regular maintenance plan – no lubrication to go (you know where) down the line.

3. LONG LIFE – The Hycar coating on the interchangeable seats of these valves provides resiliency, yet shows no swelling or dimensional changes despite continued exposure to a variety of hydrocarbons, water, oil and many solvents and chemicals.

Here is our present range:
ASA (rectangular opening)
Sizes: 2", 3", 4", 6" and 8".
Rating: 150 lbs., 300 lbs., 600 lbs. and 900 lbs.
Sizes: 2", 6" and 8".
Rating: 1500 lbs.
API (rectangular opening)
Sizes: 2", 3" and 4".
Rating: 600 lbs. and 900 lbs.
Size: 2"
Rating: 1500 lbs.

Temperatures: 225° F. max., minus 30° F. min.

Give us a call if you want to make LPG valving a problem of the past.

Cameron
IRON WORKS, INC.
P. O. Box 1212 - Houston, Texas

Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd. Time & Life Bldg., New Bond Street, London W. 1 England.

Fire and corrosion resistance offered by glass fiber-polyester laminate . . .

product retains polyester's best characteristics, has no additives

Uses: As a lightweight fabricating material for towers, tanks, hoods, trays, ejectors, and fans.

Features: Laminate of glass fiber and polyester resin is resistant to most commonly encountered chemicals. Inherent properties of polyester give laminate excellent fire resistance without reducing its corrosion resistance. No additives are used.

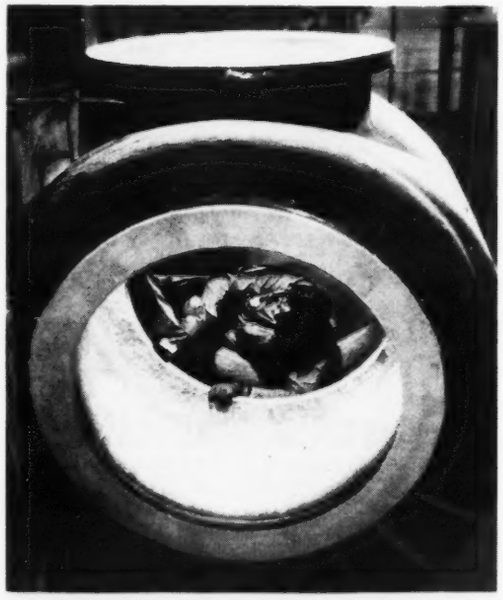
Description: Product is made by impregnating multiple layers of glass fiber mat with a polyester resin and bonding under heat and pressure. Random direction of layers of glass fibers produces a homogeneous product with delamination virtually impossible. Materials are satisfactory for application up to 250°F.

(Laminate #22 is a product of du Verre, Dept. CP, 374 Delaware Ave., Buffalo 2, N.Y. . . . or for more information check 2232 opp. last page.)

Epoxy-base compound can be utilized for liners . . .

product can be used for applying glass cloth or other fabrics

Uses: For use in applying corrosion-resistant liners. It has been used to line tanks, scrubbers, steamers, columns, and ducts. It is particularly useful with petroleum products.



Epoxy-base lining material can be brushed or sprayed on

Specify Protective Coatings With a Slide Rule!

Use Carboline's Engineering Approach!

When an engineer wants an accurate calculation, he doesn't guess – he uses his slide rule.

When you buy or specify protective coatings, don't *guess* about the system that is best for your needs. Follow the engineer's example, and use a "slide rule" – a careful, point-by-point comparison of the facts on these important features:

- **SOLIDS CONTENTS**
- **COVERAGE PER GALLON**
- **MIL FEET PER GALLON**
- **MIL THICKNESS PER COAT**
- **RESISTANCE TO CORROSIVE**
- **ESTIMATED RECOATING CYCLES**
- **COST PER SQUARE FOOT PER YEAR OF SERVICE**

FREE — a 12" x 18" comparative data chart . . . your "slide rule" for judging protective coating systems . . . permitting quick, accurate evaluation of systems on the basis of cost per square foot per year of service. Write for your free copy today.

Carboline data sheets and recommendations give you all the facts necessary to arrive at a sound, clear-cut conclusion. You will find, on all of these basic points, Carboline Coatings score high. Many Carboline users have discovered the true effectiveness and long range economy of Carboline Coatings by this scientific comparison approach.

Sales Offices in Boston, New York, Pittsburgh, Detroit, Chicago, Houston, Denver, Los Angeles, San Francisco, Toronto and other leading cities.

carboline COMPANY

333 Thornton Ave., St. Louis 19, Mo.

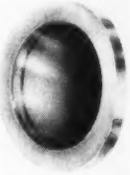
Manufacturers of PHENOLINE, POLYCLAD, RUSTBOND PRIMERS

Specialists in Corrosion Resisting Coatings and Linings

When inquiring check 2231 opposite last page

How to help prevent corrosion in a sight glass

PYREX® brand sight glasses stay clear longer because they resist the corroding and pitting effects of all chemicals except HF or strong, hot caustic solutions. No chance for an opaque build-up to prevent you from seeing the inside story when you use PYREX sight glasses.



You should use these glasses whenever you work with materials under heat and/or pressure. They withstand high temperatures and sudden changes of temperature, and will remain transparent through a long service life.

PYREX mold finished glasses are recommended for use when pressures are low or low pressures are accompanied by high temperatures.

PYREX annular edge glasses are designed for use on pressure vessels. They will safely withstand pressures up to 450 p.s.i. and temperatures up to 500 F.

There is a PYREX sight glass to fit your particular application. Let us send you a copy of Bulletin EB-20, which describes the properties, specifications and application of these glasses.

Corning means research in Glass

CORNING GLASS WORKS
CORNING, N. Y.

Please send me a copy of Corning Sight Glass Bulletin EB-20.

Name.....

Company.....

Address.....

City..... Zone..... State.....

When inquiring check 2233 opposite last page

Features: Plastic is inert to organic acids, dilute mineral acids, caustics, alkalis, and most solvents.

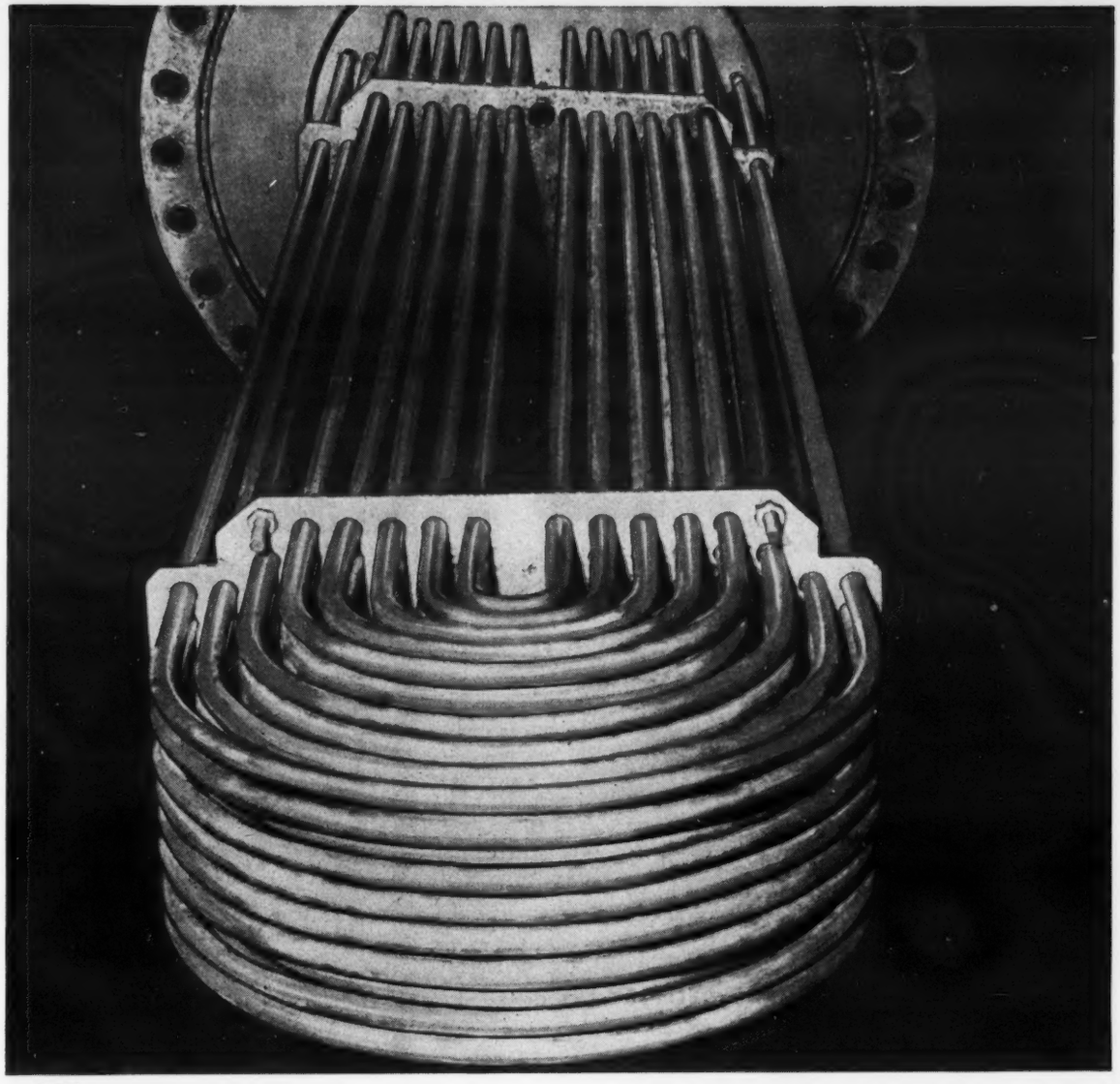
Description: Epoxy-base compound is composed of two parts which are easily mixed at time of application. It can be brushed or sprayed on and may be used satisfactorily in applying glass cloth or other fabrics. When more than one coat is required, successive applications may be made immediately. Plastic hardens at ambient temperatures in approximately 24 hours and does not require baking.

Plastic compound can be used in applying glass cloth fabrics

(Coroline 347 epoxy-base compound is product of The Homalite Corp., Dept. CP, 11-13 Brookside Dr., Wilmington 4, Del. . . . or for more information check 2234 on convenient Reader Service slip located opposite last page.)

"Spectrophotometric analysis NOW?! But boss, I'm just in the middle of a melting-point determination!"

Idea supplied by Helen Degbrinner, The Fleischmann Distilling Corp., Peekskill, N.Y.



Carpenter Stainless No. 20Cb Tubing withstands Tortuous Fabrication and Service

Note the tortuous hairpin bends in this tube bundle used in a large oil refinery to handle concentrated H_2SO_4 at temperatures from 175-194°F, and pressures from 300-400 psi. Whenever and wherever *you* design or use equipment that handles severe corrodents, check the service-proved cost-saving results you can expect with Carpenter Stainless No. 20 and No. 20Cb. Ask your Carpenter Distributor about these super stainless alloys available in tubing, pipe, sheet, plate, bars, wire, strip and billets.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

When inquiring check 2235 opposite last page

FOR CORROSION RESISTANT ECO ROTARY PUMPS

Here is a seal expressly designed for corrosive and hazardous service. It eliminates the usual pumping problems encountered with conventionally packed stuffing boxes or mechanical seals. Constructed of Carpenter 20 stainless steel throughout, it utilizes a fluid Teflon dispersion as a hydraulic sealing medium.

This seal is available from stock as optional equipment on all new pumps and can replace standard stuffing boxes on all existing Eco rotary pumps in the field.

LOW COST CHEMICAL PUMPS—DELIVERY FROM STOCK

Eco specializes in the manufacture of small corrosion-resistant pumps. These are available for immediate delivery with housings of 316 and Carpenter 20 stainless steel, Hastelloy C and Monel; impellers of Teflon, Hypalon, Neoprene and Formica.

Our engineering advisory service is at your disposal. Write or phone Eco on your pump problems. We'll be pleased to make specific recommendations.

SEND FOR ECO LITERATURE.

the big name in small pumps

ECO

ENGINEERING COMPANY

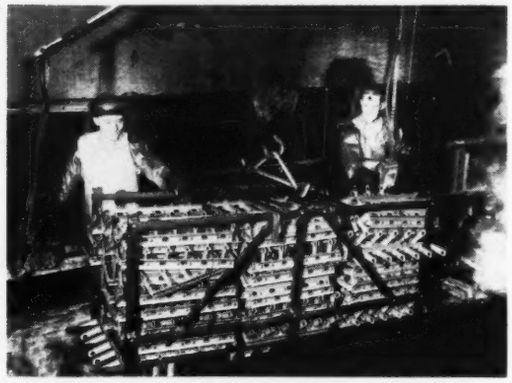
12 NEW YORK AVE., NEWARK, N. J.

When inquiring check 2236 opposite last page

Service life in sulfuric lengthened through use of specialty stainless

No. 20 alloy lasts three to four times as long as former metal

Problem: Conventional alloy used in sulfuric acid service at Line Material Company, East Stroudsburg, Pennslyvania, had to be replaced in about two years due to corrosive wear. Pickling rack and hangers made from the alloy were exposed to 5 to 15% sulfuric acid at temperatures up to 200°F. Rack and hangers support 1000 to 2000 lb loads of pole line hardware during pickling and galvanizing.



Pickling rack and hanger made from No. 20 Stainless support heavy loads of hardware during immersion in hot sulfuric acid

Solution: Hangers made from Stainless No. 20 were installed eight years ago and a rack made from the same metal was placed in service six years ago. Stainless No. 20 is a sulfuric acid resisting steel with an analysis as follows:

Carbon	0.07 max
Manganese	0.75
Silicon	1.00
Chromium	20.00
Nickel	29.00
Molybdenum	2.00 min
Copper	2.00 min

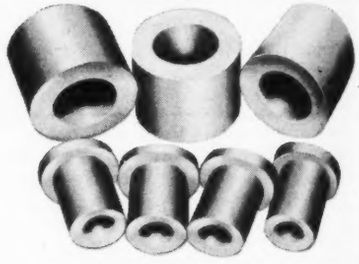
Nickel content of alloy, fortified with high chromium and molybdenum, provides a suitable matrix to place the copper in solid solution. This is important in securing the unusually good resistance to sulfuric acid.

Results: Stainless No. 20 hanger and rack remain in good condition today, with every indication that they will last for some time to come. Use of the stainless alloy has helped to achieve maximum safety for employes working at open acid tank, lowered maintenance cost, and provided uninterrupted production. Company has also

Chempro **FM-4**

COMBINES TEFLON GLASS GRAPHITE INERT LUBRICANTS into an

INERT HARD FRICTIONLESS BEARING MATERIAL



Chempro's new Style FM-4 bearings, bushings, washers, etc., have given remarkable service in pumps, mixers and reactors operating under highly corrosive conditions. Style FM-4 bearings and bushings are hard, corrosive-resistant, have a low coefficient of friction, and compare favorably in wearability with those made of metal.

Write for Bulletin CP554.

THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS*

*duPont Trademark

CHEMICAL & POWER PRODUCTS, Inc.

9 Broadway, New York 4, N.Y.

When inquiring check 2237 opposite last page

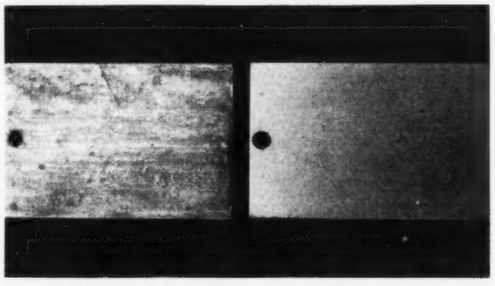
used the stainless for other parts subject to corrosive action such as baskets, stirring rods, and other racks.

(Stainless No. 20 is product of The Carpenter Steel Co., Dept. CP, Reading, Pa. . . . or for more information check 2238 on form which is located opposite last page.)

Silicone coating on aluminum withstands 2000 hours of salt spray . . .

no evidence shown of base metal attack or failure of film

In a recent test an aluminum alloy panel treated with a single coat of a silicone resin dispersion in compatible organic solvent withstood 2000 hours of continuous salt spray. Examination of panel after test revealed no evidence of base metal attack or related manifestations of failure.



Untreated aluminum panel (left) and coated aluminum panel after 2000 hours exposure to salt spray

Coating was sprayed on, allowed to air dry, then baked at 480°F for one hour before being placed in salt box. Film, which is two-tenths of one mil thick, showed no loss of adhesion during the test.

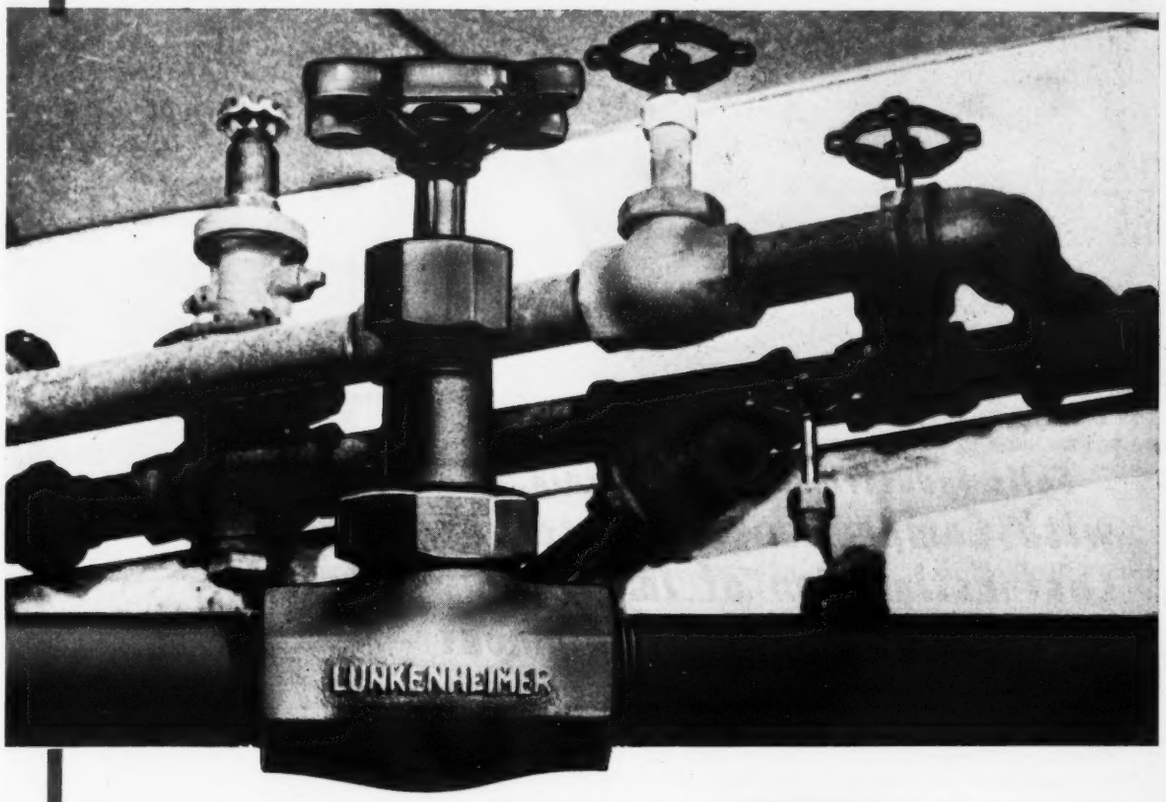
Coating is already in commercial use as a release agent to keep food from sticking to aluminum trays. Variety of other applications may be possible wherever it is necessary to prevent staining or corrosion.

(Silicone coating is product of Selinized Process Co., Dept. CP, Houseman Bldg., Grand Rapids, Mich. . . . or for more information check 2239 on form opposite last page.)

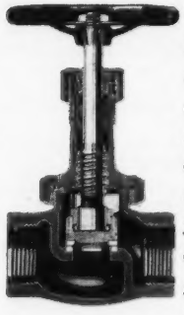
Your guide . . . to more corrosion control developments is the alphabetical product directory beginning on page 221

Don't let LOW-QUALITY drain away YOUR *Maintenance* DOLLARS

The cost of a LUNKENHEIMER VALVE *Gets smaller . . . and smaller . . . and smaller . . .* with each passing year of dependable service.



The price you pay for the average valve represents only a fraction of its total cost. Every time a valve requires repair, more and more of your precious maintenance dollars are drained away. With today's high labor costs, it takes only one or two repair jobs to spiral maintenance expense up to a point many times higher than the original price of the valve. That's why it always pays to install the best valves your money can buy. When you insist on the extra margin of good workmanship and quality materials that go into Lunkenheimer Valves, you get your investment back many times over in trouble-free, maintenance-free service. The Lunkenheimer Company, Cincinnati 14, Ohio.



There's a cost-minded Lunkenheimer Distributor in your area. Let him show you how Lunkenheimer quality can contribute to valve maintenance savings in your plant. And be sure to check the amazing performance records of LQ600, with patented Brinalloy® seats and discs.

L-357-18

- BRONZE
- IRON
- STEEL
- PVC

LUNKENHEIMER®
THE ONE *Great* NAME IN VALVES

When inquiring check 2240 opposite last page

Falls Industries is first again... with Comprehensive Data for Cost Estimation of Impervious Graphite Processing Equipment

This 32 page report presents costs and equipment specifications on all the standard impervious graphite processing equipment produced by Falls Industries. Equipment is illustrated with drawings, diagrams or photographs. Costs are tabulated in dollars per square foot of heat transfer surface, or other convenient unit.

Also covered in this report are the famous IMPERVITE impervious graphite Rupture Disk, and the IMPERVITE CROSSBORE heat exchanger—the most recent exclusive developments of Falls Industries.

The following unsolicited comments are typical of the many received:

"This is exactly the type of information we like to get with costs included."

"It presents the most comprehensive picture of equipment data issued on the subject."

Follow the responsible leadership of Falls Industries for practical development of better processing equipment, and greater service.

FALLS FI INDUSTRIES INC.
PHONE: CHurchill 8-5357
TELETYPE: SOLON 0-720

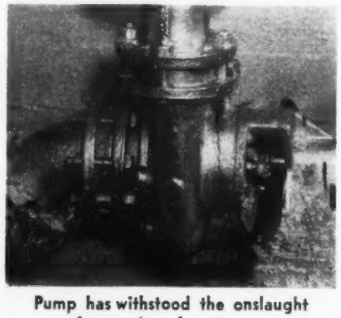
FALLS INDUSTRIES, INC.
31909 Aurora Road • Solon, Ohio
Gentlemen: Send me a copy of your "DATA FOR COST ESTIMATION" Bulletin No. 249.
Name ..... Title .....
Company .....
Address .....
City ..... Zone ..... State .....

When inquiring check 2241 opposite last page

Weak sulfuric at 140°F withstood by alloy for 18 years . . .

solution also contains traces of hydrochloric acid

Three pumps made from an alloy containing about 15% chromium, 16% molybdenum, 4% tungsten, and 54% nickel were installed in an acid disposal system at Continental Steel Corporation, Kokomo, Indiana, in 1938, and have given trouble-free service ever since.



Pump has withstood the onslaught of corrosives for 18 years

Pumps handle a solution containing up to 4% sulfuric acid at 140°F. Solution also contains traces of hydrochloric acid. Pumps are full-ball bearing, single-suction units, which handle 110 gpm, seven days a week.

Pump bodies, impellers, sealing rings, flanges, packing glands, and shafts are made of the corrosion-resistant alloy, known as Hastelloy alloy C. This alloy has given good service in a wide variety of corrosive applications in industry.

(Hastelloy alloy C is product of Haynes Stellite Co., div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. . . . or for more information reader may simply check 2242 on form which is located opposite last page.)

(Pumps are product of Buffalo Pumps, Div. of Buffalo Forge Co., Dept. CP, 475 Broadway, Buffalo, N. Y. . . . or for more information reader may simply check 2243 on form which is located opposite last page.)

Available from **VANTON!**

3 LINES OF **PLASTIC PIPE, FITTINGS** AND **VALVES**

PVC (Unplasticized, Unmodified, Polyvinyl Chloride)
For outstanding chemical resistance.

Styrene Copolymer
For exceptional impact strength.

Buna N (Acrylonitrile-Butadiene)
For excellent temperature resistance.

Vanton, with many years of pioneering experience in the manufacture of plastic pumps, now makes available pipe, fittings and valves in the above basic materials. These plastic compounds have been selected to offer as broad a coverage as possible with respect to the application requirements of the process industry.

• For Complete technical information send for Catalog PI 101

VANTON
PUMP & EQUIPMENT CORP.
201 Sweetland Ave. Hillside, N. J.
division of Cooper Alloy Corporation

When inquiring check 2244 opposite last page

Jars, pots, tanks, etc. made from "U.S." Chemical Porcelain are leak-proof, mechanically strong, dense and of virtual *zero* porosity. They are completely inert to all chemicals except hydrofluoric acid and hot caustics. And porcelain contains *no iron* to be absorbed — no induced contamination! Its non-aging characteristics make for long, maintenance-free service life. No-seam construction, rounded corners and smooth lustrous white glazed surfaces provide for quick, easy cleaning.

Our complete Chemical Porcelain line of jars, pots and tanks includes a wide variety of stock items in capacities ranging from 2½ to 500 gallons.

WRITE TODAY — *ask for* BULLETIN 410

U.S. STONEWARE *Process Equipment Div.*
Akron 9, Ohio
241D-1

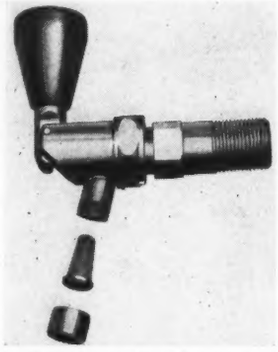
When inquiring check 2245 opposite last page

Faucet has fluorocarbon seal rings and anti-flash screen . . .

stainless steel unit is self closing, jam proof, and insures positive shut-off

Uses: Dispensing corrosive and inflammable fluids from storage drums or tanks in chemical, food, pharmaceutical, and photographic industries.

Features: Metal-to-metal contact has been eliminated by using fluorocarbon seal rings. Anti-flash screen prevents propagation of any flames entering storage drum through spout in handling of flammable solvents. Faucet opens against coil-spring pressure and insures positive shut-off when not manually held open.



Faucet can be disassembled quickly for cleaning. It can be chemically or steam sterilized

Description: Corrosion-resistant faucet is fabricated of 304 stainless steel throughout except for seal rings. A guard prevents faucet from being jammed in open position. Seals assure no after-drip.

Unit can be disassembled quickly for cleaning, and because of materials of construction, can be chemically or steam sterilized. Shank is supplied in interchangeable sizes of ⅜, ¾, and ½" with tapered threads to allow a snug fit in bung threads of dispensing drums.

(Model U-008 corrosion resistant faucet is a product of Economy Faucet Co., Dept. CP, 12 New York Ave., Newark 1, N.J. . . . or for more information reader may simply check 2246 on the convenient Reader Service slip which is located opposite last page.)

Is it strange

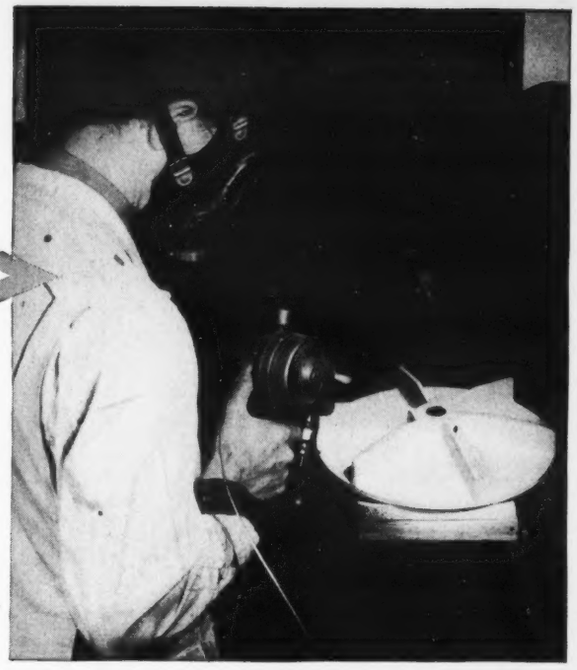
. . . that you should receive a magazine such as CHEMICAL PROCESSING without being subjected to the "formality" of a token subscription payment?

Not at all! For reasons why . . .

. . . see page 79.

How Stauffer Chemical whips fan corrosion

Silver metallizing stretches wheel life from 6 weeks to better than one year in corrosive gases.



Fan rotor being metallized with silver for protection against corrosive gas

The *Stauffer Chemical Company,* Niagara Falls, N. Y., operates a chloro-organic acid unit in which process fans are used to convey corrosive gas in the operation of a column. Gas is primarily anhydrous hydrogen chloride, contaminated with small quantities of chloro-organic acid compounds.

A number of different coatings were tried out in an effort to prolong the life of the stainless steel wheels and shafts, as well as the cast-iron housings. Best of these lasted 4 to 6 weeks on the wheels, 2 to 4 months on the housings.

Test work carried on with *Metal-Cladding, Inc.,* of North Tonawanda, N. Y., indicated that fine silver was relatively unaffected by the gases in use. So the first wheel was metallized with this material after the base metal had been mechanically cleaned, sprayed with .005" of molybdenum for a bonding base, and .020" of nickel for toughness. Final silver coating was .025" thick.

A year later the first metallized surfaces were still in excellent condition. Since the cost of the metal spray work was about equal to the cost of a new untreated unit, the application paid for itself in about three months. In addition, inspection time and downtime were substantially reduced.

The following Metco* System contractors are set up to help you solve your corrosion problems with metallizing. For further information or copy of descriptive bulletin, write, wire or phone Metco Systems headquarters, address and phone number below.

**Reg. U.S. Pat. Off.*

Akron Sand Blast & Metallizing Company
Arthur Tickle Engineering Works, Inc.
Dix Engineering Co., Inc.
F. W. Gartner Company
Gulf Engineering Company, Inc.
Metal-Cladding Inc.
Metal Spraying Corporation
M W Protective Coatings
Div. of Metalweld, Inc.
St. Louis Metallizing Co.
Steel and Tank Service Co.

Metco Systems

10 Bridge Street, Westbury, Long Island, New York

Telephone: Edgewood 4-1308

METCO SYSTEMS
10 Bridge Street,
Westbury, Long Island, N. Y.

Please send me descriptive bulletin on the Metco Systems.

name _____

title _____

company _____

address _____

city _____ zone ____

state _____

When inquiring check 2247 opposite last page

all of these steam traps are impulse!

Take your choice! There is a Yarway Impulse Steam Trap for practically every trapping requirement in your plant.

Revolutionary when introduced 20 years ago, the *Yarway Impulse* principle has been proved by more than a million in service everywhere, is still gaining new friends every day.

SERIES 60—for *normal steam trap requirements;* pressures to 400 psi, temperatures to 450° F. Stainless steel body and working parts. Six sizes, ½" to 2".

NO. 20-A—available in ½" size only— similar to ½" #60, but with low capacity—designed especially for *light condensate loads.*

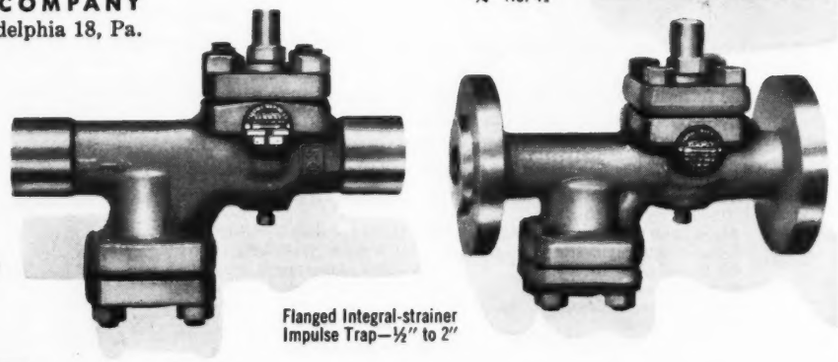
SERIES 120—same as Series 60 but for higher pressures and temperatures (600 psi, 750° F). Featuring all-stainless steel construction. Six sizes, ½" to 2".

SERIES 40—for *heavy condensate loads* requiring high capacity traps. Sizes ½" to ¾" in stock, larger sizes (1½", 2", 2½") available.

INTEGRAL STRAINER TRAPS—for marine use and for high pressure trapping service in steam power plants with pressures up to 2500 psi. Six sizes, ½" to 2"; flanged and socket-welding ends.

All Yarway Impulse Steam Traps are available through 270 convenient local Industrial Distributors. For descriptive bulletin on any type of Impulse Trap, write . . .

YARNALL-WARING COMPANY
125 Mermaid Avenue, Philadelphia 18, Pa.



Socket-weld Integral-strainer Impulse Trap—½" to 2"

Flanged Integral-strainer Impulse Trap—½" to 2"

YARWAY **IMPULSE STEAM TRAPS**

The Impulse that revolutionized steam trapping 20 years ago

When inquiring check 2248 opposite last page

CORROSION CONTROL

Flexible duct designed for corrosive fumes . . .

made from vinyl-coated glass fiber fabric over stainless steel

Uses: For handling most corrosive fumes with the exception of formic acid, phenol, hydrochloric acid and hydrofluoric acid.

Features: Flexible duct is rugged, air-tight, and has been successfully tested against numerous chemicals.

Duct has successfully withstood a variety of corrosive fumes in recent tests

Description: Duct is constructed of a vinyl-coated glass fiber fabric, with a supporting spiral made of stainless steel. Duct is easy to cut and install.

(Flexible duct Type 47-1D is product of The Wiremold Co., Dept. CP, Hartford 10, Conn. . . . or for more information check 2249 on convenient Reader Service slip which is located opposite last page.)

Corrosive fumes can't hurt temperature regulator made of stainless . . .

unit was developed mainly for applications in chemical plants

Uses: Regulator was developed mainly for use in chemical plants. One particular application suggested is in processes where ammonia vapors are present.

Features: Unit is designed to withstand the corrosive effects of certain fumes, gases, acids, and chemicals.

(*Continued on page* 119)

For more information on product advertised at right, specify 2250 . . . see information request blank opposite last page.

Small valve takes on big job at U.S. Steel

That's a 4" Aloyco Gate Valve of Aloyco 20 stainless steel guarding the outlet of one of the largest acid tanks ever built.

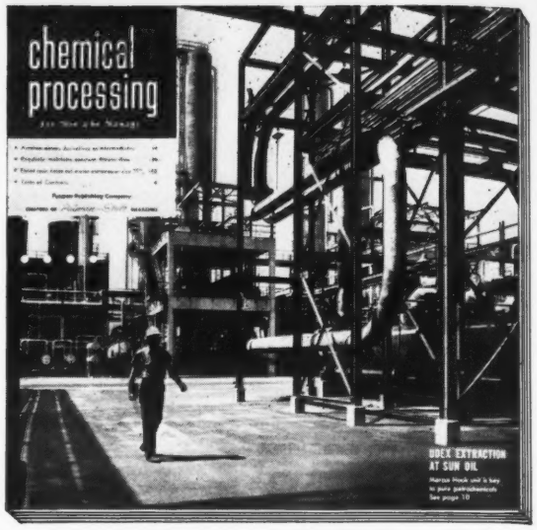
It's one of the new units erected as part of United States Steel's modernization of the Coke and Coal Chemical Division facilities at Gary, Indiana. Aloyco valves are widely used here in both the Otto Construction Corporation's ammonium sulfate saturators and in the solvent recovery units which were engineered by United Engineers & Constructors, Inc.

They're also widely used by other leading manufacturers in the chemical processing and petroleum industries. Perhaps Aloyco valves could save you money in handling corrosives. Want more information? Write Alloy Steel Products Company, Inc., 1301 West Elizabeth Ave., Linden, New Jersey.

6-27

Longer Lasting
ALOYCO
VALVES
1ST IN CORROSIVE SERVICE

Can you "pay for" a magazine like this? . . . . . with a $3.00 or $5.00 subscription?



This magazine costs more than $40.00 per year

Maybe you've thought publishers make money on a $3.00 or a $5.00 subscription . . . that that is why they ask you to subscribe.

No, it's not true . . . your $3.00 or $5.00 fall far short of "paying" for *any* really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

Then, why? . . . yes, *why* do some publishers charge a nominal rate for a subscription . . . but other publishers send their magazines without charge?

Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you — the reader — do not *really pay* for the magazine's service.

No—advertisers pay the bills . . . and so, logically, advertisers *demand* the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation . . . and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

You don't "pay"—CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with $3.00 or $5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why . . . CHEMICAL PROCESSING hand-picks only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than $40.00 per year . . . without charge . . . as *you* are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with $3.00 or $5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

. . . . . .

Chemical Processing

PUTMAN PUBLISHING

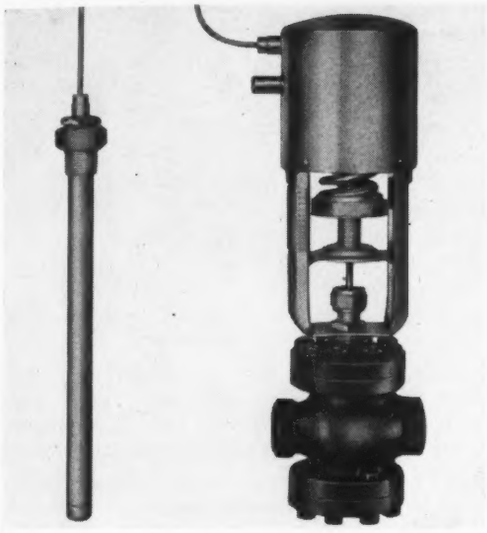
published by: Putman Publishing Company

also publishers of:
FOOD PROCESSING
INDUSTRY POWER
FOOD BUSINESS

EPA NBP

"Executive Magazines for Industry"

(*Continued from page* 118)



Regulates temperatures between 20 and 455°F in corrosive applications

Description: In standard models of temperature regulator, entire upperworks are of stainless steel. For extremely corrosive situations, valves can also be furnished in stainless. Unit is available in sizes from ¼ to 4" for temperature ranges between 20 and 455°F.

(No 11061-R stainless temperature regulator is product of Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Dept. CP, Box 400, Knoxville, Tenn. . . . or for more information check 2251 on form opposite last page.)

"Just as I thought! . . . Freelancing!"

BIFURCATOR® FAN

key to your corrosive fume removal problems

BIFURCATOR is the divided-housing fan backed by 30 years experience in design and application.

Ideal for corrosive, high temperature and hazardous fume removal from:

CERAMIC KILNS
CERAMIC PLANT INSTALLATIONS
CHEMICAL PLANT INSTALLATIONS
CHEMICAL LABORATORY HOODS
CORE BAKING OVENS
DRYING OVENS
DYE HOUSES
ELECTROPLATING TANKS
FOOD PROCESSING OVENS
FOUNDRIES — POURING AREAS
FOUNDRIES — SHAKE-OUT AREAS
FURNACES
GLASS PLANTS
LITHOGRAPHIC OVENS
LUMBER DRYING KILNS
METALLURGICAL PLANTS
METAL PICKLING VATS
PAPER MILLS
SLASHERS
STRIPPING TANKS
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De Bothezat FANS
A DIVISION OF
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

Mail coupon today for free Catalog DB-37-55.

DeBOTHEZAT FANS DIVISION, Dept. CPD-357
American Machine and Metals, Inc.
East Moline, Illinois

☐ Send Bulletin DB-37-55 containing complete data on the Bifurcator for exhausting fumes.
☐ Have a DeBothezat representative call.

COMPANY
ADDRESS
CITY ZONE STATE
ATTENTION MR.

When inquiring check 2252 opposite last page

Corrosioneering News

Quick facts about the services and equipment available to help you reduce corrosion and processing costs.

Published by The Pfaudler Co., Rochester, N.Y., U.S.A.

Pilot Plant Spans Pharmaceutical Operations—Almost any operation in pharmaceutical manufacture can be performed in this new 4 x 9 x 2½-ft. pilot plant unit designed for Lakeside Laboratories, Milwaukee, by Pfaudler. It can reflux, react, distill and handle quickly a host of functions. High-vacuum distillation is done at as low as 50 microns Hg absolute pressure. All of the equipment is made of Type 316 stainless steel.

Unusual pilot plant assembly steps up Lakeside's synthetic work

"Virtually all pilot plant operations in pharmaceutical chemistry can be performed in a single new compact assembly specially designed for Lakeside Laboratories, Inc.," states Joseph N. Jacques, plant engineer.

The assembly, part of the expanding synthetic chemistry division, was made to Lakeside specifications by Pfaudler. It requires a floor space of only 4 feet by 9 feet by 30 inches.

It can reflux, react, distill and handle quickly a host of physical and chemical functions. The new unit is particularly noteworthy because high vacuum distillations are achieved at as low as 50 microns Hg absolute pressure.

Made entirely of Type 316 stainless steel, it will handle most of the organics used in Lakeside's products. It is presently used for distilling N-Ethyl-3-Hydroxypiperidine.

All of the initial synthetic work is concentrated on the production of antispasmodics, produced under the trade names of "Dactil," "Piptal," and "Cantil." The staff has found the equipment fast, versatile and easy to manipulate, Mr. Jacques said. The unit can be used for small-scale pilot plant operations as well as full-scale production.

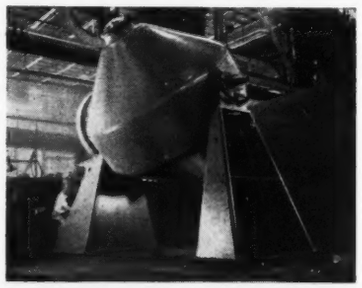
Low-cost corrosion-resistant "Chemstors" widely used for storing organics and inorganic acids, polyvinyls, distilled and potable water, etc. Glassed steel prevents product contamination, is easy to clean. Sizes range from 750 to 35,000 gallons (above). Horizontal or vertical construction.

Test glassed steel dryer-blender obtains amazing results for users

On test at one of the leading pharmaceutical companies recently, the new Pfaudler glassed steel dryer-blender (patents applied for) came through with flying colors on several products.

The most difficult test, done first, involved a material that had the consistency of whipped cream. The results were amazing, and *proved that one Pfaudler unit could be used to dry seven to ten different products, replacing three conventional tray dryers of 100 trays each!*

Results like these speak for themselves and in this instance the manufacturer placed an order for a 6-ft. Pfaudler dryer-blender on the spot. You are invited to test your products in our laboratory test blender, sending your own men along to observe results, if desired. Or, we can arrange to send a field unit to your plant.



One of the biggest built so far—255 cu. ft. Fully charged this blender weighs 20,000 lbs. Heavy-duty gear drive tumbles bucket at 8 RPM with 15 HP motor. Magnetic brake gives instant and positive control.

THE PFAUDLER CO.
Dept. CP-3, Rochester 3, N.Y.

Please send me the following:

☐ Chemstor Tanks, Bulletin 918;

☐ Dryer-Blender Data Sheet 26.

Name.....

Title.....

Company.....

Address.....

City.....Zone.....State.....

When inquiring check 2253 opposite last page

As little as 10 to 20 ppm protects storage tanks and pipelines from corrosion . . .

inhibitor is added directly to product and forms a protective film on metal

Uses: Preventing corrosion of storage and shipping facilities by finished petroleum products.

Features: Dosages as low as 10 to 20 ppm of corrosion inhibitor have cut corrosion damage as much as 80 to 90% in tankers, tank trucks, pipelines and storage tanks. It is added directly to finished petroleum product and forms a monomolecular film on all metal surfaces.

Description: Product is a dark-amber liquid nitrogenous organic corrosion inhibitor. Dosages vary according to conditions, from 5 to 50 ppm. Costs range from 0.03 to 0.15 mils per gallon of finished product.

Physical Properties	
Density lb/gal	7.66
Specific gravity	0.92
Flash point (C.O.C.) °F	135
Fire point °F	145
Pour point °F	−36
Viscosity at 120°F cp	25

Inhibitor is hydrocarbon soluble at use dosages and is dispersible in water. It may be injected by chemical pump or drip lubricators. Residual effect lasts for some time after cargo has been unloaded.

(Nalco 160-T corrosion inhibitor is product of National Aluminate Corp., Dept. CP, 6212 W. 66th Place, Chicago 38, Ill. . . . or for more information check 2254 on form opposite last page.)

Graphite entrainment separator ready for insertion in pipe line . . .

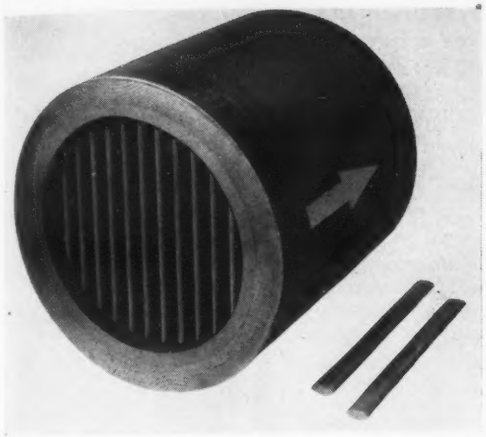
corrosion-resistant unit that doesn't clog, works on impingement principle

Uses: For the removal of liquid particles from air and other gases.

Features: Scrubber is a corrosion-resistant, compact, self-contained unit ready for insertion in a pipe line.

Description: Impingement type entrainment separator is made of impervious graphite. Rods of the graphite, streamlined in cross section, are staggered in rows within the cylinder. Although minimum clearance is ¼", which prevents clogging, a beam of light will not pass through. As gas to be scrubbed flows through cylinder, moisture particles impinge on separator rods and gas flows on through.

Separation efficiency removing particles of 11 microns in size is 99.8% at one atmosphere pres-



Entrainment separator is inert to mineral acids, organic solvents, salt solutions, and other corrosives

sure. Scrubber is designed for gas approach velocity of about 30 fps. Unit can be operated at temperatures ranging from −40 to +340°F at pressures from full vacuum to 65 psig.

(Type MV entrainment separator is product of National Carbon Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 2255 on the convenient Reader Service slip which is located opposite last page.)

Three specialized lubricants resist more than 100 corrosive agents . . .

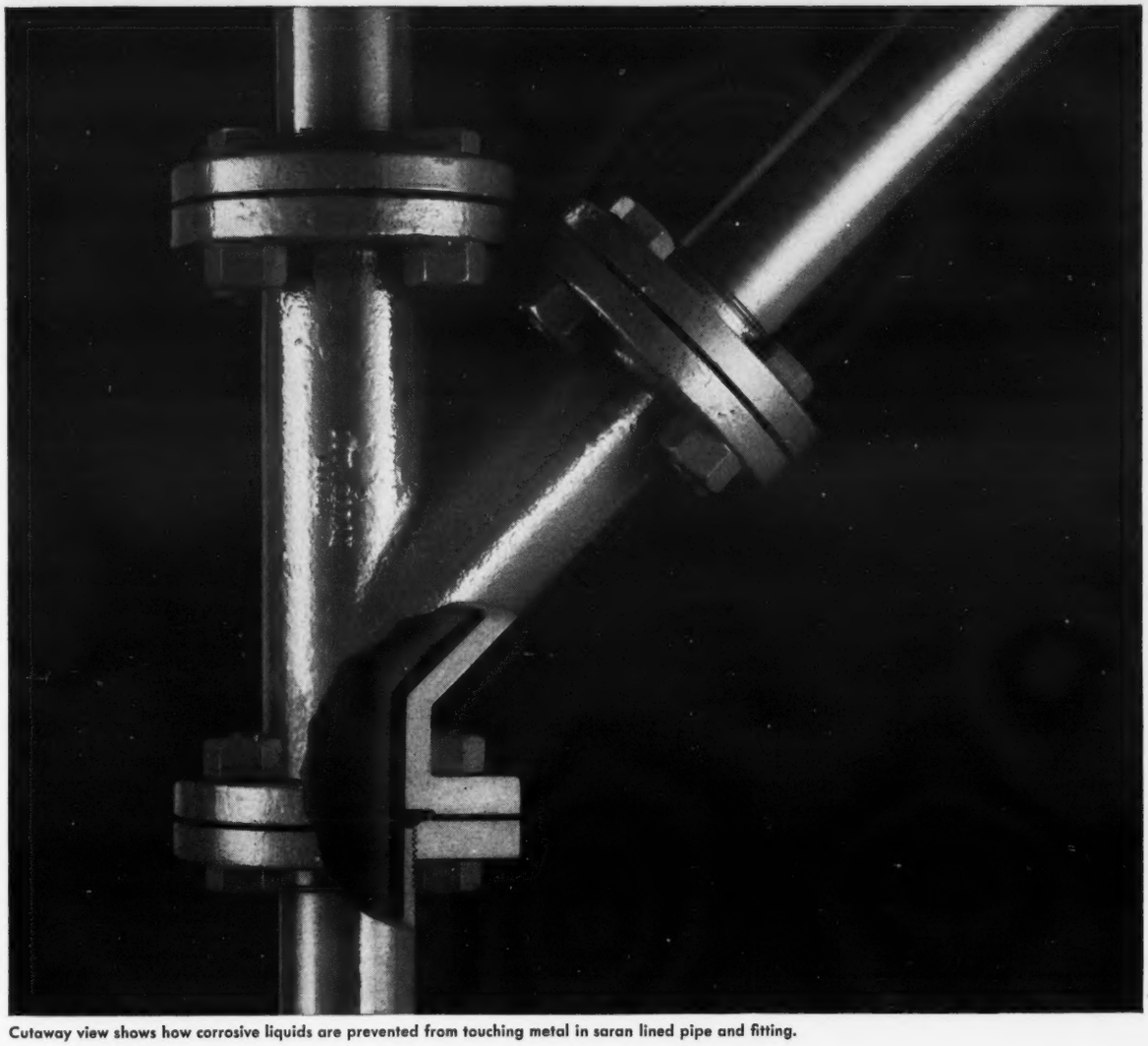
operating temperature range is 0 to 350°F

Uses: Line of acid- and alkali-resistant greases can be used in the chemical, rubber, plastics, power, paper, textile, dyeing, brewing, and food industries.

Features: Specialized lubricants provide effective protection against more than 100 corrosive agents and solvents. They prevent leakage, preserve packings, protect equipment and floors, and lower operating costs.

Description: Line of lubricants consists of three types covering a wide range of operating temperatures from 0 to 350°F. One type has an aluminum base, another a bentone base, and the third is a lithium-base material. They have a smooth, non-fibrous body, are pale amber to light cream in color, and are made in four consistencies. ASTM penetration range is from 200 to 350.

(Corrosion-resistant greases are product of Keystone Lubricating Co., Dept. CP, 3100 N. 21st St., Philadelphia 32, Pa. . . . or for more information check 2256 on the convenient Reader Service slip opposite last page.)



Cutaway view shows how corrosive liquids are prevented from touching metal in saran lined pipe and fitting.

You can see why saran lined pipe is so corrosion resistant!

It's steel pipe lined with durable saran . . . acids, alkalies can't harm it

Corrosive liquids won't harm this pipe, its fittings or its valves. A thick, tough saran lining completely protects it from commonly used acids, alkalies, other corrosive liquids.

It's strong, too. Saran lined pipe will withstand working pressures up to 300 psi. Saran lined valves and fittings are available for working pressures of 150 and 300 psi. You can use the same supports you would use with ordinary steel pipe.

Ease of fabrication will keep your installation costs down. Cutting and threading can be readily accomplished in the field with conventional hand tools or power equipment.

For tomorrow's protection, investigate saran lined pipe today. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. SP1591B
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

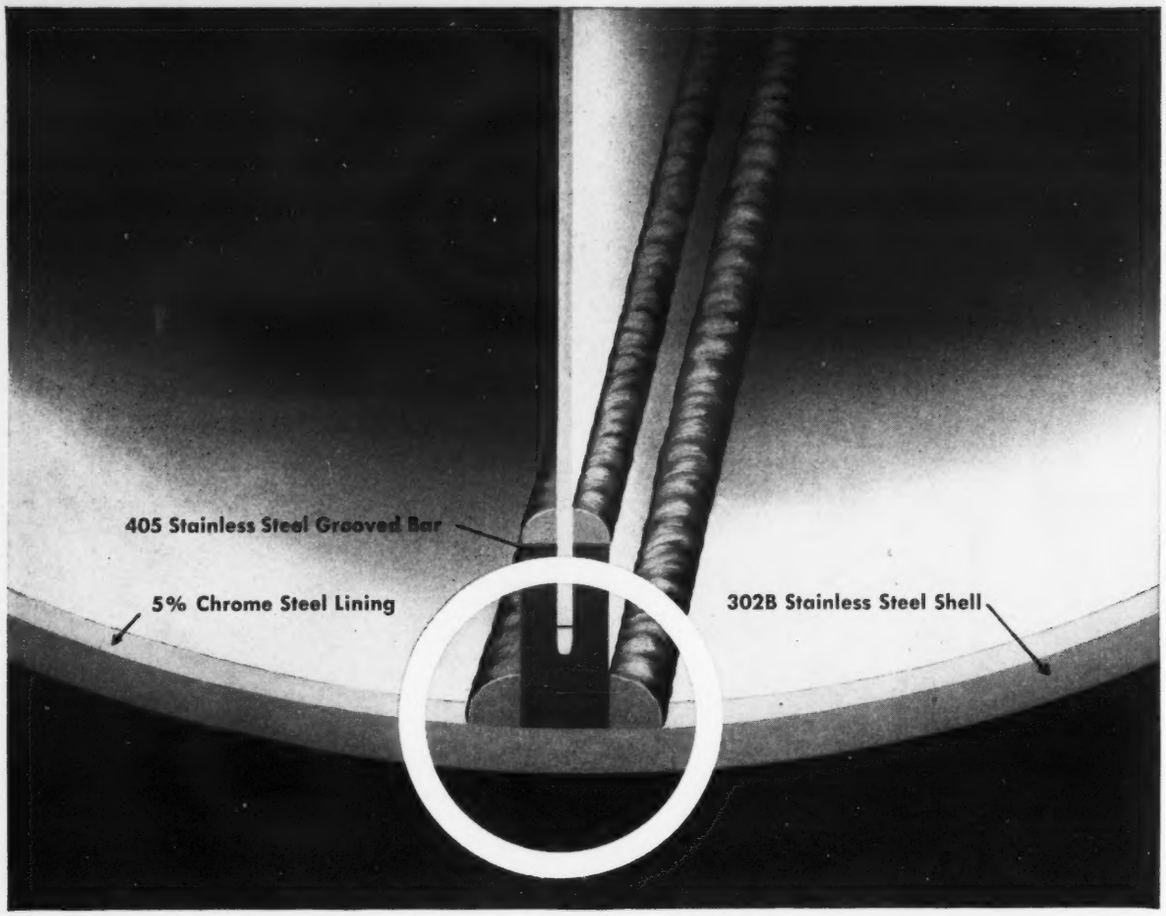
Please send me information on saran lined pipe, fittings and valves.

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

When inquiring check 2257 opposite last page



Inco-Rod "A" welds 3 steels at one joint!

Salvages vessel with cracked welds

The vessel you see above was originally designed for 302B Stainless Steel Shell . . . 5% chrome steel lining . . . 5% chrome grooved bars to hold a baffle plate in position.

Trouble developed when these grooved bars were welded into the vessel. Despite preheating, a Zyglo test revealed cracks all along the joint. Weld repair was hopeless.

Then someone suggested an ingenious solution: *Substitute 405 Stainless Steel grooved bars. That way you eliminate the need for preheat. Then use Inco-Rod "A"* electrode to weld the 405 to both 302B shell and 5% chrome lining.*

It worked like a dream! Inco-Rod "A" electrode joined the *three steels* with strong, sound, crack-free welds!

Do you need to weld dissimilar alloys? Ferritic or austenitic stainless steels, low alloy or mild steels, high nickel alloys, copper-nickel or other alloys? Then try Inco-Rod "A". . . the electrode with the green flux coating . . . because it gives strong, ductile, corrosion-resisting welds . . . of X-ray quality.

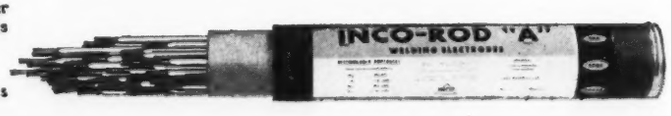
You'll like the way Inco-Rod "A" electrode *handles,* too. It's operable in all positions. Gives spray-type arc . . . easy slag removal.

Write Inco and ask about the dissimilar alloys *you* want to weld. Our welding specialists constantly bring new data about Inco-Rod "A" electrode in from the field . . . and this information may provide a ready answer to your welding problem.

*Trademark of The International Nickel Company, Inc.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO-ROD "A" electrode is supplied in 14-inch lengths in four diameters, 3/32-, 1/8-, 5/32-, and 3/16-inch (the 3/32-inch is center grip) . . . packed in 5-lb. containers.



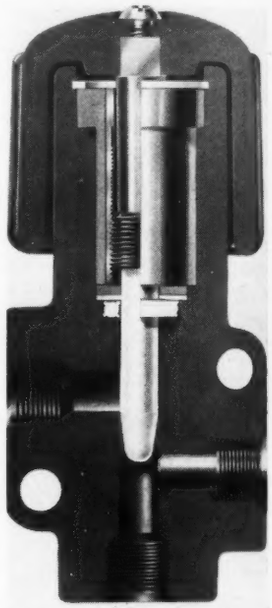
Welding Products • electrodes, wires, fluxes

When inquiring check 2258 opposite last page

Gives precision control of flow even in corrosive service, will not stick or gall . . .

needle valve is manufactured from PVC, Teflon, Kel-F, or 18-8 stainless steel

Uses: Needle valves are specially designed to meet exacting requirements of modern fluid systems, where corrosion problems exist from internal, external, chemical, electrical, or natural corrosive elements.



Corrosion-resistant needle valve is compatible with standard fittings and piping methods of any material

Features: Valves provide a micrometer adjustment that permits precision control and recording of settings. Units are manufactured from polyvinyl chloride, Teflon, Kel-F, and 18-8 stainless steel. They will not stick or gall.

Description: Units are compatible with standard fittings and piping methods of any material. They are available in ⅛ and ¼" female pipe sizes and ⅛, ¼, and ⅜" OD male tube connections. Valves operate at temperatures up to 170°F, and up to 170 psi, or higher for intermittent duty. Two mounting bosses with clearance for ¼" bolts are provided.

(Corrosion-resistant needle valve is a product of Chemtrol Corp., Dept. CP, 1513 West El Segundo Blvd., Compton, Calif. . . . or for more information check 2259 on form opposite last page.)

Corrosion-resistant fasteners — cost-saving ideas

Brochure of 24 pages describes manufacturer's process for making all kinds of corrosion-resistant fasteners. Cost-saving ideas are presented by citing actual case histories. Special fasteners being produced are illustrated and discussed.

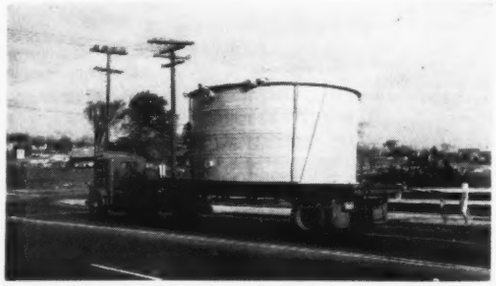
Form 613 is issued by H. M. Harper Company, Dept. CP, 8250 Lehigh Ave., Morton Grove, Ill. Specify 2260 on form opposite last page.

Sulfuric acid, 20% at 150°F, stored in one-piece polyester tanks that resist corrosion . . .

two units hold 5000 and 7000 gal, respectively

Two storage tanks for 20% sulfuric acid at 150°F will soon be in service in processing of copper-laden ore. Units, fabricated from glass fiber and polyester, are 10 and 14′ in diameter. They will hold 5000 and 7000 gallons respectively.

One-piece construction adds to corrosion resistance of the tanks since there are no joints or seams.



One of polyester resin tanks being transported to plant site in Utah

Tanks can also be used for concentrated nitric acid, glacial acetic acid, hot hydrochloric acid, sodium hydroxide, bromine, or formaldehyde.

(Chemical storage tanks were fabricated by Carl N. Beetle Plastics Corp., Dept. CP, 145 Globe St., Fall River, Mass. . . . or for more information check 2261 on convenient Reader Service slip located opposite last page.)

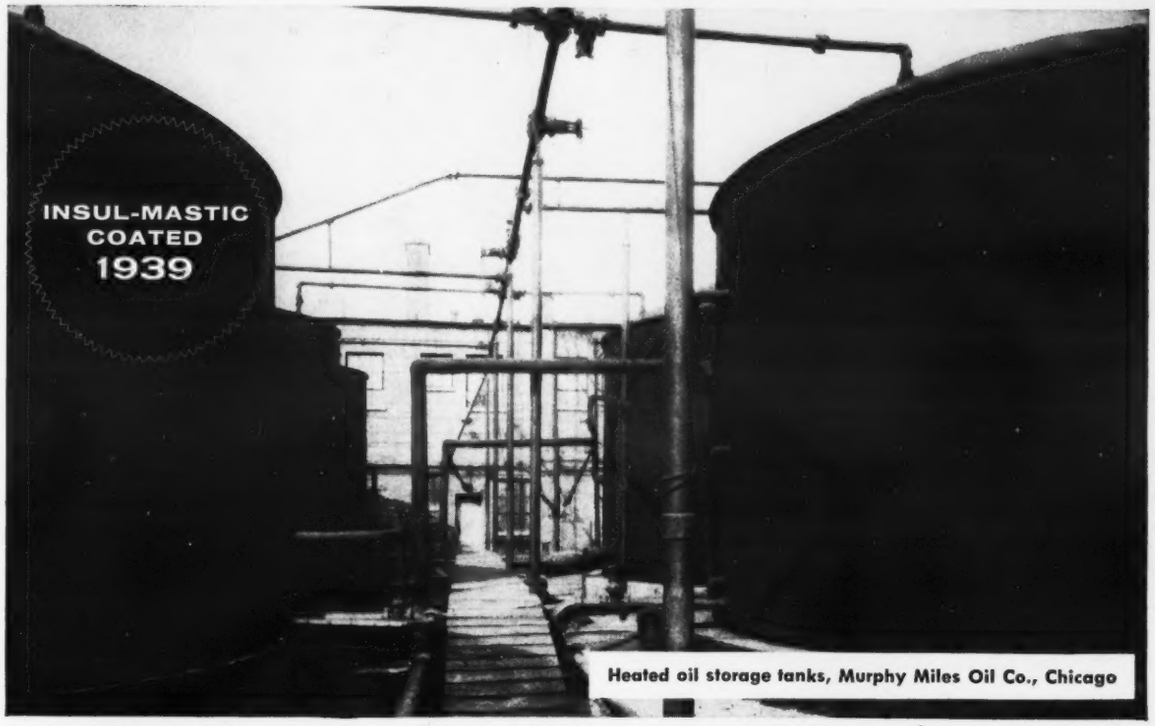
Casting alloy wall chart

Comprehensive wall chart, 17 x 22″, covers brass, bronze, and nickel-silver casting alloys. Chart details information regarding 37 standard alloys, their Navy, SAE, ASTM, and Federal specification designations, and chemical composition by percentages of ingredient metals.

Casting Alloy Wall Chart is issued by Henning Bros. & Smith, Dept. CP, Scott Ave. and Randolph St., Brooklyn 37, N. Y. When inquiring specify 2262 on form opposite last page.

This month's Processing and Engineering Data Section starts on page 208

Proof again—the best costs you less!

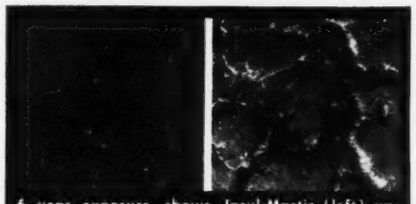


Heated oil storage tanks, Murphy Miles Oil Co., Chicago

17 Years without maintenance for these *Insul-Mastic* coated tanks

Ordinary asphaltic coatings can't possibly stand the test of years like Insul-Mastic "Gilsonite" coatings — and you can't ever be sure ordinary coatings are protecting against metal damage, or merely hiding it.

Understandably, Insul-Mastic costs a little more initially, but you can't find a better system for preventing corrosion, sealing out moisture, vapor sealing or handling the many specialized insulating requirements of industry. The proof is in the hundreds of installations like Murphy Miles Oil Co. where Insul-Mastic coatings continue to give the same *complete* protection they gave back in 1939. Your Insul-Mastic Representative will provide complete details without obligation.



6 year exposure shows Insul-Mastic (left) unchanged. Ordinary mastic (right) shows shrinkage and deterioration that breeds metal damage.

GILSONITE makes the difference

Gilsonite is one of the most resistant of all materials used for protective coatings. It is composed of highly complex hydrocarbons saturated to the limit of their capacity, not susceptible to displacement by other elements nor to combination with acids and alkalis, nor to oxidation for many years by exposure to the atmosphere. It is better than 99.5% pure, being entirely free from volatiles and other short-lived impurities. *For years Insul-Mastic Gilsonite content has been far greater than any other mastic. Many contain no Gilsonite!*

MAIL THIS COUPON TODAY TO:
INSUL-MASTIC CORPORATION OF AMERICA
7758 West 61st Place, Summit, Illinois

☐ Send information ☐ Have Representative call

Name_____ Title_____

Company_____

Address_____

City_____ State_____

Think first of the coatings that last!

Insul-Mastic
CORPORATION OF AMERICA
7758 WEST 61st PLACE SUMMIT, ILLINOIS

When inquiring check 2263 opposite last page

REDUCE YOUR PACKING INVENTORY WITH R/M "VERSI-PAK"®

R/M "versi-pak" allows you to drastically reduce your packing inventory, because you can use it on many types of pumps against a wide variety of fluids. Although primarily designed for oil and solvent service up to 350°F and 600 psi, it is highly effective for service against water solutions, weak acids and caustics.

R/M "versi-pak" is a nonjacketed plastic packing composed of selected asbestos fibers in combination with special binding materials and lubricants. It is dense and relatively inert. Its high compressibility provides positive sealing at high pressures yet maintains relatively low pressure at the packing gland. The surface is free of loose materials, and there is no excessive loss of lubrication during service. The rectangular cross section, besides giving greater handling strength, reduces the number of rings required per set.

This packing is available in two formulations: No. 1845, a black, graphited type for general use; No. 1846, white and nongraphited, for use in food handling and other special services. Both types are furnished in spiral and butt-cut rings, sizes 1/8 to 1 in., in increments of 1/16 in.

For complete information on R/M "versi-pak," write for this booklet today.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS — including Vee-Flex, Vee-Square, Universal Plastic and "versi-pak"®; GASKET MATERIALS, "TEFLON"* PRODUCTS. SEE YOUR R/M DISTRIBUTOR.
* A Du Pont trademark

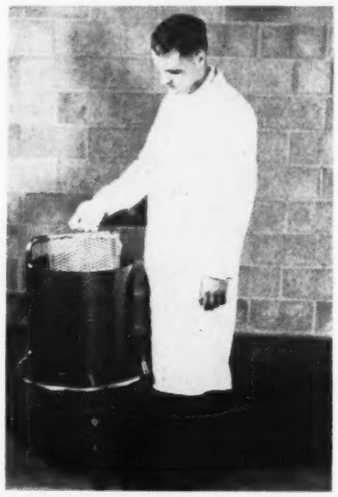
R/M
PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

FACTORIES: Passaic, N.J.; Bridgeport, Conn.; Manheim, Pa.; Neenah, Wis.; No. Charleston, S.C.; Crawfordsville, Ind.; Peterborough, Ontario, Canada
RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks Clutch Facings • Industrial Adhesives • Bowling Balls • Laundry Pads and Covers

When inquiring check 2264 opposite last page

Mobile, dual-purpose unit provides both fluidized and spray coatings

Recently made available, mobile, dual-purpose unit can be used for applying either spray coatings or fluidized coatings. Unit can be used for applying finely-divided polyethylene powders to metal targets by either method. In addition to polyethylene, nylon and fluorocarbons can be utilized.



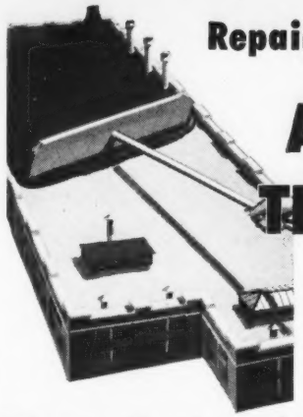
Coating unit rides on rubber-tired, ball-bearing wheels

(Mark III coating unit is product of American Agile Corp., Dept. CP, 5461 Dunham Rd., Maple Heights, Ohio. Check 2264A opposite last page.)

Describes Teflon packings for pumps and valves

Non-corrosive, non-contaminating, non-sticking, Teflon packings for pumps and valves are described in 12-page bulletin. Types of packings, service ranges, specifications, and information on how to order are covered.

Bul TP-1255 is issued by United States Gasket Co., Dept. CP, 608 N. 10th St., Camden 1, N.J. Check 2265 opposite last page.



Repair your roof AT HALF THE COST!

NEW TROPICAL COLD PROCESS ROOFING SAVES YOU MONEY!

Make your old roof as good as new—and save 50%. No special equipment or training needed. Your own unskilled labor can easily apply Tropical Cold-Process Roofkoter. You save on labor, restore years of trouble-free service to leaky roofs. Roofkoter forms a tough, flexible, water-tight film that resists extreme heat and cold, will not blister, harden or dry out. Applies cold, eliminates fire hazard. Roof reconditioning the Tropical way can save leaky roofs.

FREE! **"Saving Old Roofs" gives you the complete story on modern roof maintenance. Write for your copy today!**

TROPICAL PAINT COMPANY
1128-1286 W. 70th, Cleveland 2, Ohio
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883
SUBSIDIARY OF PARKER RUST PROOF CO.

When inquiring check 2266 opposite last page

STAPCO STAINLESS

STAPCO JACKETED TANKS give you THIN-WALL PROCESSING ECONOMY

Unique thin-wall tank design provides maximum heat transfer for economical processing. Double stainless steel tank walls "quilted" for great strength and safety. Wide variety of shapes, sizes and controls available to handle any hot or cold processing task. Insulated as required. Agitators, valves and other required attachments may be located where the job dictates.

Write for full information.

A Complete Engineering Service
STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

When inquiring check 2267 opposite last page

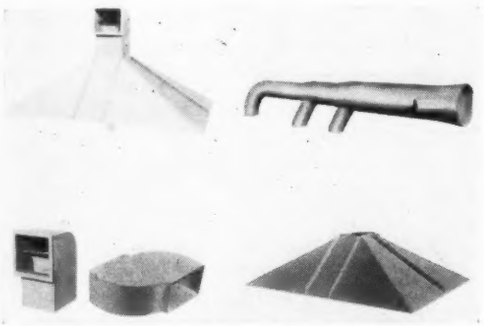
Hydrofluoric acid resisted by plastic fume ducts and hoods . . .

can be fabricated to virtually any desired shape

Uses: For handling corrosive fumes in a variety of applications.

Features: Material used for ducts and hoods has a high degree of resistance to acids, including hydrofluoric, as well as alkalis and solvents.

Description: Fabricated of a thermosetting material which is combined with glass fiber or other fibers, ducts and hoods can be produced to virtually any required shape. Plastic material is lightweight, strong, and attractive in appearance. Only a minimum of time is required for installation.



Tanks and ducts can be formed to handle virtually any volume of corrosive gas at any desired pressure

(Duracor plastic fume ducts and hoods are products of The Ceilcote Co., Inc., Dept. CP, 4834 Ridge Rd., Cleveland 9, Ohio . . . or for more information reader may simply check 2268 on form which is located opposite last page.)

Reprint discusses properties, applications of butyrate pipe

Composition, properties and applications of butyrate plastic pipe are discussed in eight-page reprint of technical paper. Descriptions of chemical composition of butyrate molding materials, physical and chemical properties of Tenite butyrate plastic for pipe, creep test data on pipe, fittings, fabrication, and installation techniques, are covered.

Reprint of tech paper "Properties and Applications of Butyrate Pipe" is issued by Eastman Chemical Products, Inc., Subsidiary, Eastman Kodak Co., Dept. CP, Kingsport, Tenn. When inquiring reader may simply specify 2269 on the convenient Reader Service slip which is located opposite last page.

MR. ALEX PANCRAZI (left), Pisa Univ. (Italy) graduate, Chief Chemist, Eastern Wine Corp., Bronx, N.Y. (Right), Michael De Piano, N.Y. representative, Cooper Alloy Corp.

PANCRAZI OF CHATEAU MARTIN (Eastern Wine Corp.) tells why he specifies "Cooper *Alloy Only*" on stainless steel valves and fittings

Q. Mr. Pancrazi, why have you changed to stainless steel valves and fittings at Chateau Martin?

A. To assure product purity. Other metals can cause minute contamination reducing clarity and brightness; stainless steel does not.

Q. What valve model do you find most suitable?

A. After extensive testing, we picked a renewable-disc inside-screw globe valve—Cooper Alloy only.

Q. Why "Cooper Alloy only"?

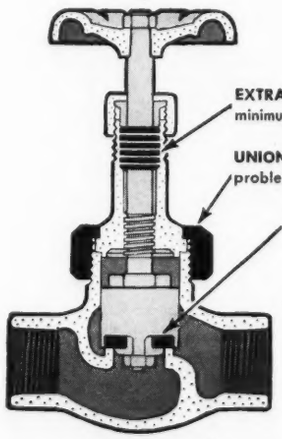
A. Because of three features I find combined nowhere else: renewable retained disc; union-bonnet construction; and extra-deep square-compression stuffing box.

Q. Why is each of these features important?

A. Soft disc gives better seal; retention in metal jacket prolongs its life. When disc replacement is needed, union-type bonnet eliminates difficulties normally found in screwed-in bonnets, removes another threaded joint from product contact. Extra-deep stuffing box with unique square compression reduces maintenance, gives tighter seal at stem.

Q. Don't any competitive valves possess these features?

A. Not one has them all. That's why, to maintain our product contamination-free and to reduce maintenance costs, we insist on "Cooper Alloy only."


EXTRA-DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
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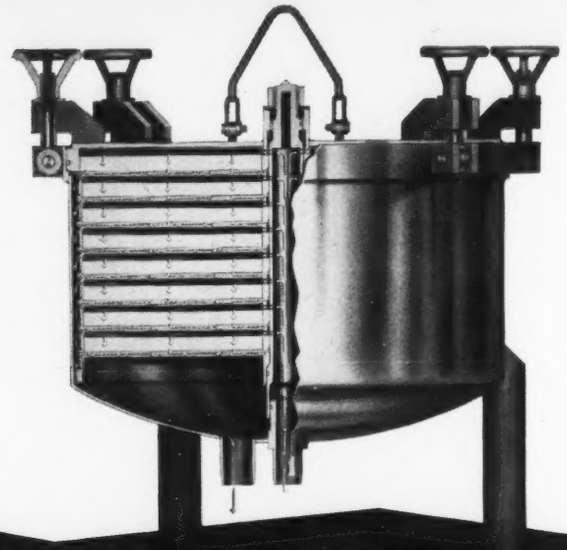

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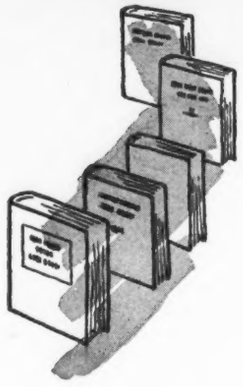

The Chemistry of Phenolic Resins

Reviewed by D. S. DAVIS
Coordinator of General Engineering Studies
University of Alabama

Devoted to the formation, structure, and reactions of phenolic resins and related products, Robert W. Martin's 298-page book is probably the only really exhaustive treatment in English of these subjects. Wide industrial experience with phenolics, epoxide resins, silicones, and other condensation polymers puts the author in a unique position to write authoritatively.

Chapters that deal with phenol alcohols, dihydroxydiphenylamines, phenolic resins, cure of phenolic resins, joint reactions of phenols and aldehydes, heterocyclics, reactions of phenolic resins with unsaturates, reactions of phenolaldehyde products, and reaction kinetics bristle with complicated structural formulas and are fortified with nearly 1400 literature references.

An unusually voluminous index and an excellent printing job on heavy paper combine to assure this book, which represents difficult reading, a warm welcome among the knowledge in the field.

To obtain "The Chemistry of Phenolic Resins" remit $9.50 direct to John Wiley and Sons, Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 2272 on form opposite last page.

Medicinal Chemistry Volume III

Produced under the auspices of the Division of Medicinal Chemistry of the ACS, this 346-page volume is number three of the series. Series provides comprehensive and systematic summaries of available data on biological properties of chemicals. It is the expressed purpose of the editors, F.F. Blicke and R. H. Cox, that by correlation of structure and activity, visualization of new molecular structures that may lead to synthesis and testing of new compounds should be stimulated.

Volume III covers methadone and related analgesics, quaternary ammonium germacides, non-mercurial diuretics, and synthetic analogs of physostigmine. There are a total of 173 tables and 731 references.

To obtain "Medicinal Chemistry, Vol. III" remit $10.50 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N.Y. When inquiring specify 2273 on form opposite last page.

The Chemistry of Petrochemicals

Reviewed by KENNETH A. KOBE
Professor of Chemical Engineering
University of Texas

The fabulous chemicals-from-petroleum industry will continue to be called the petrochemical industry in spite of all the "rock chemists," who no longer look on petroleum as "rock oil." Growth of the industry began in the early 1920's when Carbide and Carbon Chemicals Company introduced ethylene glycol, and this growth has been almost astronomical.

Professor Astle, after a brief historical chapter, discusses petrochemicals according to their formation or reactions, as: Synthesis of paraffin hydrocarbons, reactions of paraffin hydrocarbons, preparation of olefins, reactions of olefins, polymerization and alkylation of olefins, diolefins, acetylene, naphthenes, aromatic hydrocarbons, olefin oxides, alcohols and ethers, aldehydes and ketones, acid-acid anhydrides and esters, amines and nitrites.

Background material for the book has been the published articles and patents concerning the various compounds and reactions.

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Where there are numerous reviews and research articles, as Hass, McBee and coworkers on nitration and halogenation, the book has summed up this material completely. When the research articles are obviously removed from industrial practice, patent literature is drawn on for what may or may not be industrial practice. This lack of criticalness is apparent in numerous places in the book.

Because the book does give a good over-all survey of the petrochemical field it will be used widely by students of organic chemistry and by industrial chemists who desire to know where petrochemicals come from and the reactions involved, but who are not concerned with plant operations.

To obtain "The Chemistry of Petrochemicals" remit $8 *direct to Reinhold Publishing Corp.,* 430 *Park Avenue, New York* 22, *N.Y.*

Unit Operations of Chemical Engineering

As pointed out in the preface, this 945-page book was written primarily as a textbook for undergraduate chemical engineering students in their junior or senior years. The authors, Warren L. McCabe (Polytechnic Institute of Brooklyn) and Julian C. Smith (Cornell University) have continued the traditions of earlier books on the subject.

Divided into 16 chapters, the book treats each unit operation separately. General discussions cover fluid mechanics, flow of heat, and mass transfer, each giving scientific and theoretical foundations for several operations. Unit operations are covered from both the practical and theoretical aspects.

Book includes 113 worked-out examples, nearly 150 unsolved problems, 500 figures, and 275 references to the chemical engineering literature. Photographs, as such, have been omitted. Most of the apparatus shown in the figures is generalized and is not exactly like that of individual makers. Nomenclature throughout the book is unified, and tables of symbols are given at the end of each chapter.

To obtain "Unit Operations of Chemical Engineering", remit $10.50 direct to the McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, New York.

Experimental Physical Chemistry

The fifth edition of Daniels' "Experimental Physical Chemistry," like all its ancestors during these twenty-seven years, illustrates competently the basic principles, affords excellent training in experimentation, familiarizes one with the usual apparatus, and sparks an interest in research. Farrington Daniels and his co-authors, (Mathews, Williams, Bender, and Alberty), keep cleverly away from the imperative mood in this 482-page book—instead they cause the reader to study the experiment and to plan his procedure from the wealth of theory, practical suggestions, good supporting material, and the 134 figures.

Most teachers would welcome a better derivation of the two forms of the classical Clausius-Clapeyron equation, and a statement of their restriction to ideal gases. No mention is made of the extremely convenient special plotting papers that are based on log p vs $1/(t + 273)$ and on log p vs $1/(t + 230)$. However, even five experienced teachers can't please everyone—if they please *anyone* they're doing well. Daniels and his men have done *very* well, as you'll agree when you study the organization of the material, the line cuts, the brief but adequate appendix, the index, and the table of four-place logarithms, complete with proportional parts. Chapter 17, which deals with the treatment of experimental data, is

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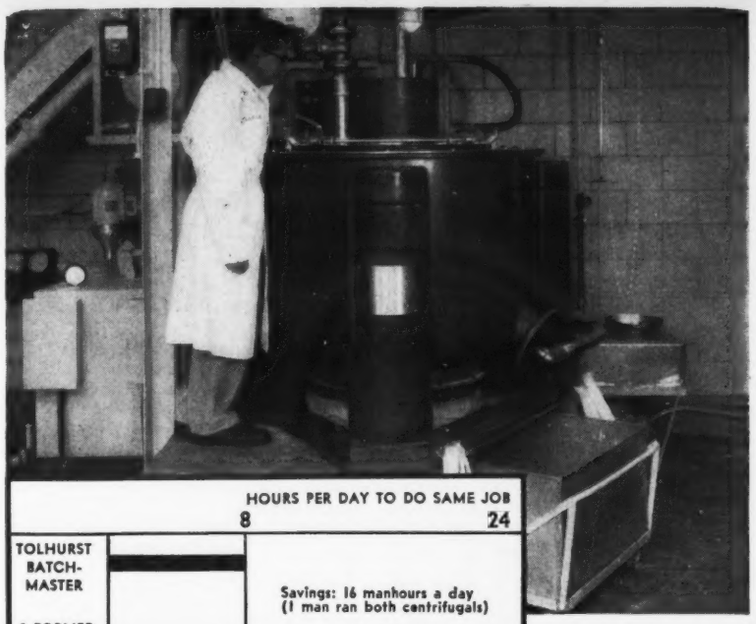

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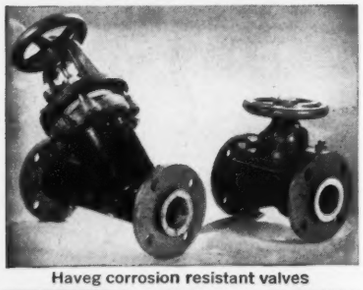

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(*Continued from preceding page*)

particularly good, though it could easily be strengthened with additional references to books in this field.

If you're a teacher and want to give your course in physical chemistry the modern touch, or if you're a chemist or chemical engineer, long out of school and in need of an authoritative refresher in the subject, treat yourself to a careful examination of this outstanding text.

To obtain "Experimental Physical Chemistry," remit $6.50 direct to the McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, N. Y.

Technique of Organic Chemistry Volume II

Reviewed by GEORGE M. TOFFEL
Associate Professor of Chemistry
University of Alabama

This book, edited by Arnold Weisberger, is divided into three parts: Catalytic, Photochemical and Electrolytic Reactions. It may be interesting to note that this second edition contains 543 pages; first edition contained only 219 pages.

Section on catalytic reactions is written by V. I. Komaresky, C. H. Riesz, and F. L. Morritz. It deals effectively with principles, theory, catalyst preparation, and special techniques, and describes a number of reactions. In the portion dealing with discussion of various types of catalytic reactions, detailed instructions are given for preparation of important catalysts such as Raney nickel and copper chromite. Continuous flow as well as batch processes are described. Thorough coverage on design of high-pressure equipment is given. Some 43 tables list specific catalytic reactions including compound, temperature, catalyst, and yield.

Second section on photochemical reactions was written by C. R. Masson, V. Boekelheide, and W. Albert Noyes, Jr.

Subject matter deals with usefulness and limitations of photochemical reactions, design of apparatus and factors which are important in photochemical work. Section provides an excellent survey of theoretical considerations, nature of photochemical reactions, and quantum yield light sources and methods of measuring their intensities. A considerable amount of space is devoted to behavior of organic compounds on irridation. Part on chain reactions induced by

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light includes descriptions of chlorination, bromination, iodination, chlorosulfonation, carboxylation with oxalyl chloride, addition to olefins and nitroso compounds, reaction of quinones with aldehydes, and reaction of polyhalogen compounds. A procedure for the preparation of benzopinacol from benzophenone and isopropyl alcohol (yields 93-94%) is described. Procedure consists of putting chemicals in a flask, stoppering and exposing to sunlight, and observing course of reaction by noting crystals of the pinacol form, — an excellent first preparation for those who have never experienced a photochemical preparation.

Third section, on electrolytic reactions, is written by Sherlock Swann, Jr. This section is devoted to preparation and reaction of organic compounds in electrolytic cells. No mention is made of the effects of silent electric discharge on organic compounds. This section, like the others, is concise and well-done. It covers general theory, apparatus and technique, reactions at the cathode, anode reactions coupling, salts of carboxylic acids, and reactions with electrolytic halogen. Last part of the book consists of 61 pages that tabulate over 500 electrolytic reactions, listing their reactants, products, yields, and literature references.

Standard of presentation is excellent throughout the book. Treatments of the subjects are not exhaustive, but chemists who wish to find out *what* can be done with catalysts, electricity, and light, and in a general way *how* it can be done, will find this book a valuable source of authoritative information.

To obtain "Technique of Organic Chemistry, Vol. II" (second edition) remit $11.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N. Y. When inquiring specify 2279 on form opposite last page.

Process Chemistry

(Progress in Nuclear Energy — Series III)

This 407-page volume is based on the proceedings of the Geneva Conference on the Peaceful Uses of Atomic Energy. Edited by F. R. Bruce of Oak Ridge National Laboratory, J. M. Fletcher of A.E.R.E., Harwell, and H. H. Hyman and J. J. Katz of Argonne National Laboratory, it consists of selected papers on chemical processing methods used by major countries in their

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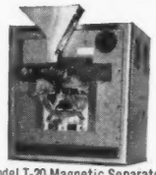

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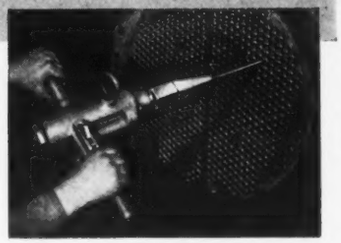

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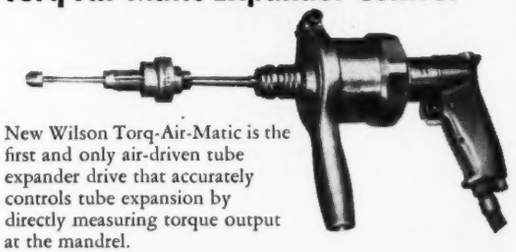

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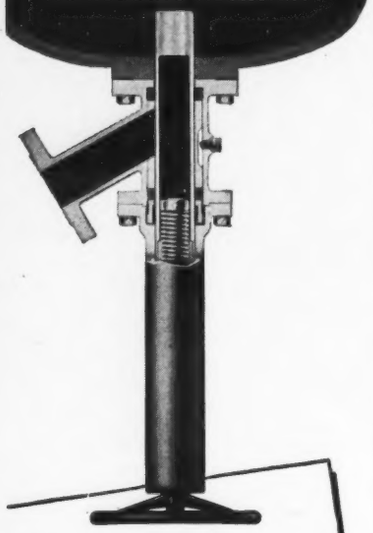

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atomic energy programs. The book also includes 15 hitherto unpublished papers on the subject.

Essentially all aspects of chemical processing in the nuclear field are covered. Included are recovery and purification of uranium and thorium from their ores, reactor fuel processing, and methods of producing isotopes. Solvent extraction, precipitation, volatilization, and pyrometallurgical processing methods are reviewed. Processes for recovering iodine, strontium, ruthenium, carbon-14, phosphorus-32, and sulfur-35 from irradiated materials are described. Factors involved in selecting radiochemical processes are considered, and radiation damage to processing reagents is discussed.

The book is divided into eight chapters, each containing from three to eight individual papers. There are three appendices. Glossary defines 48 nuclear terms. Charts, tables, and flow diagrams are clearly presented and easy to read. All in all, the book is up-to-date, authoritative, and should be of value to individuals engaged in the chemical aspects of nuclear energy.

To obtain "Process Chemistry — Progress in Nuclear Energy, Series III", remit $12.00 direct to McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y.

Statistical Mechanics

Reviewed by WILLIAM B. ARD
Assistant Professor of Physics
University of Alabama

Since the topics taken up in T. L. Hill's book are not of a general nature, the text would probably not find much use in college courses on statistical mechanics. However, this 432-page volume will be valuable as a reference in study of the structure of solids and liquids.

The researcher in the field of solids and liquids will find detailed discussion of statistical methods that have been found useful in treating these more or less bound states of matter. Of course, the same statistical methods are applicable to any system of interacting particles.

While the first chapter is written at an intermediate level, it is mostly a definition of terms and description of models and is too brief to be of much use to a student.

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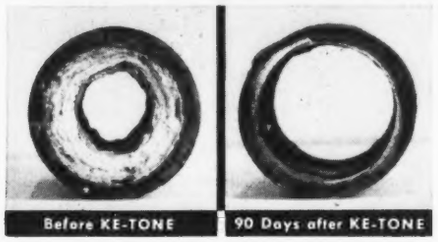

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well-written and represents a good introduction to the subject. However, the heart of the book is in the application of statistical methods to problems which are so complicated that only a person with considerable experience in this field would be able to gain much from the text.

To obtain "Statistical Mechanics" remit $9 direct to McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.

High Pressure Technology

Reviewed by D. S. DAVIS
Coordinator of General Engineering Studies
University of Alabama

Edward W. Comings, who heads the school of chemical and metallurgical engineering at Purdue University, has brought a distinguished newcomer into the fold. It's "High Pressure Technology," with 572 pages and 234 excellent figures — a real addition to the McGraw-Hill series in chemical engineering. He leads off with an informative introduction and proceeds to a fine chapter on chemical processes by R. N. Shreve, well-known author of "The Chemical Process Industries," and another on metals by H. C. Van Ness. Remaining nine chapters deal authoritatively with safety, equipment, thick-walled cylinders, experimental techniques, gases and liquids, the unit operations of chemical engineering, chemical equilibrium, chemical reactors, and the synthesis of ammonia.

Eight appendices give excellent coverage of units and dimensions, values for the Redlich and Kwong equation; constants for equations of state; properties of solids, liquids, and gases; sizes of equipment; limits of flammability for gases and vapors; techniques for cleaning mercury; and steels and other alloys for high pressures. Sixty-eight problems and questions for the twelve chapters are collected on nine pages near the end of the book and are followed by a convenient twelve-page glossary of terms.

Professor Comings has given us a much-needed volume, well documented and valuable both as reference and as text. Figures, indexing, and typography meet the usual high standards of the series.

To obtain "High Pressure Technology" remit $11.50 direct to the McGraw-Hill Book Co., Inc., Dept. CP, 330 West 42nd St., New York 36, N. Y.

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SITES—Acreage, topography, utility services, photos, maps, industrial districts.

MATERIALS—Metals, industrial chemicals, wood, textiles, farm products.

MINERALS—Location, reserves, potentials, analyses.

WATER—Quantitative, qualitative analyses.

POWER—Capacity, network, industrial service, costs.

FUEL—Coal, oil, natural gas service, costs.

ENGINEERING—Schools, enrollments, specialization, research laboratories, services.

TAXES—Inter-state and community comparisons, assessment ratios, millages, corporate.

COMMUNITIES—Characteristics, size, regions, housing, schools, culture, recreation.

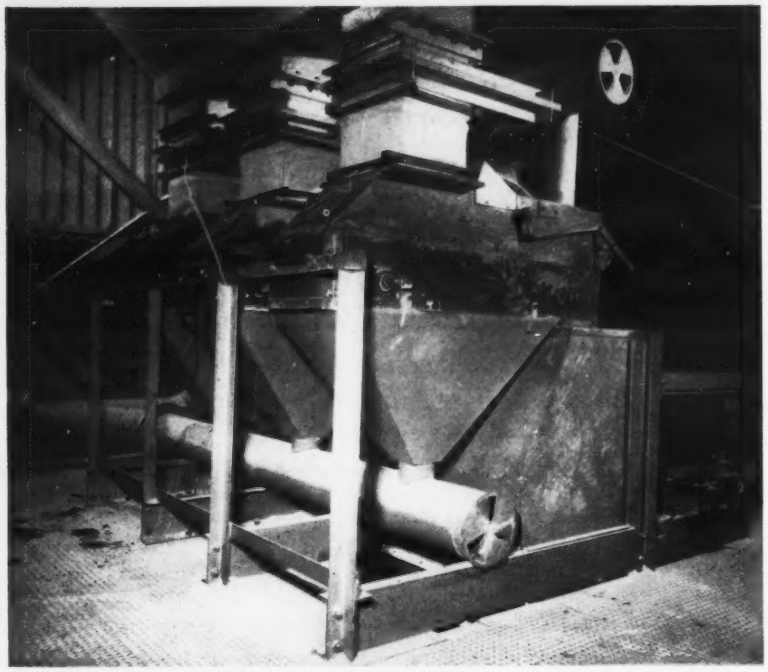
Industrial Representatives Available For
Inspection Tours, Conferences And Consultations

For free copy of "Plant Location Services" pamphlet, or for more details on 100% financing, write or call:

PENNSYLVANIA DEPARTMENT OF COMMERCE
Main Capitol Building, 487 State Street
Harrisburg, Pennsylvania
Phone: CEdar 4-2912

When inquiring check 2285 opposite last page

AUTO**WEIGH**TION at Dow —



THAYER SCALES preweigh 20 charges per minute with perfect control of light or dense Soda Ash

Now soda ash (and other materials) can be automatically weighed and packed from a belt feeder. Three Thayer Scales at the Dow Chemical Company, Freeport plant, can preweigh 20 charges per minute with an average accuracy of 2 ozs.

The heart of this Autoweightion system is the patented *Thayer Plate Leverage System* that is guaranteed accurate for the life of the scale. This unvarying accuracy is the solution to many new automatic process problems involving scales for batching, filling and checkweighing.

For instance, the expanding petro-chemical industry uses more Thayers than any other scale. May we send you information on automatically weighing polyethylene, polychloride, carbon black, resins, soda ash, etc.

THE Thayer SCALE

BATCHING • FILLING • CHECKING — AUTOMATICALLY BY WEIGHT

AUTOWEIGHTION

THAYER SCALE CORP., 6 Thayer Park, PEMBROKE, MASS.

When inquiring check 2286 opposite last page

In shipping small, precious chemicals, General Electric found that spending a little extra on containers —

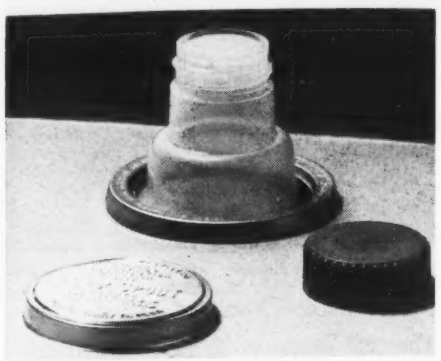
CUTS SHIPPING COSTS

By **FRANK E. McELROY,** Associate Editor
With **REUBEN GUTOFF,** Supervisor
Process Engineering Group
Silicone Products Dept.
Chemical and Metallurgical Div.
General Electric Co., Waterford, N.Y.

Problem: In many applications, a little silicone goes a long way. Therefore these useful, and relatively expensive materials are often shipped in small-scale quantities, sometimes as little as one gallon. Keeping silicones absolutely free from contamination is a must, so choice of container is important. Although lined drums are used on larger shipments, small amounts were formerly shipped in glass jugs. These were inexpensive — the one-gal size cost only 19c — and they required very careful handling in storage, filling, packing, and shipping.

After filling, jugs were "floated" in vermiculite and packed in a heavy cardboard carton. These had to be shipped by a special carrier and required special han-

Shipping clerk glues label on one-gal pail which is now ready to ship. To the left is glass jug and double-cardboard container used formerly, which required extra packing care



Above—close-up of spout assembly with pouring spout extended. In left foreground is metal seal used in shipment. At the right is plastic screw cap which has been removed from the spout

Below—latest design of cap has bail handle which makes it easier to pull up the spout

dling. All this, too, was expensive.

Solution: After experimenting with a number of more efficient ways of packing these chemicals, G-E decided on a one-gal steel pail lined with a high-bake organic coating. After filling, the openings are closed with a tamper-proof polyethylene/steel seal which incorporates a flexible polyethylene spout that permits easy pouring.

Results: Although this pail with the plastic closure costs about $1, it does not have to be packed and can be shipped by the most economical means possible. It does not require special handling, because nothing can be broken.

Net packing and shipping savings have amounted to $3000 during the first year.

Added advantages: Users like the pails. They not only make convenient storage containers about the plant, but are fine for such personal uses as paint cans and gasoline containers for the auto or outboard motors.

(Lined pails are products of Vulcan Containers Inc., Dept. CP, PO Box 161, Bellwood, Ill. . . . or check 2287 opposite last page.)

(Closures are products of Rieke Metal Products Corp., Dept. CP, Auburn, Ind. . . . or for more information check 2288 opposite last page.)

Another first for 3M Research...

NOW...POLYESTER FILM YOU CAN HEAT SEAL!

Impossible? Not any more! "Scotchpak" Brand Polyester Film takes a seal as tough as the film itself—and easily: a temperature of 275° to 359°F. and 20-60 psi is all that's required.

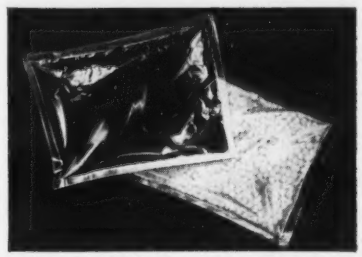
"Scotchpak" is the perfect packaging material for critical applications where inertness of the wrapper and protection of the contents under extreme temperature conditions is vital. It resists most solvents and chemicals, has high moisture inertness and high tensile strength.

You can use "Scotchpak" for packaging such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup and mustard, surgical dressings—and many others. It even makes an ideal container liner or insulation pillow.

For more information, send for the folder described at right.

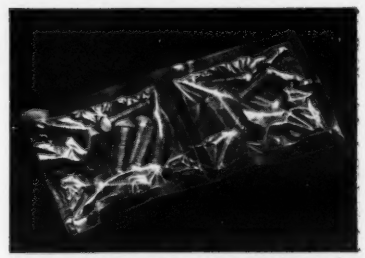
TRADEMARK
"SCOTCHPAK"
BRAND
HEAT-SEALABLE POLYESTER FILM

Look what you can do with it!

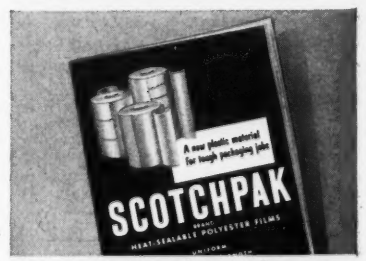


ACIDS or volatile chemicals can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "Scotchpak" Polyester Film. Also lines drums and cartons.

FOOD ITEMS are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled *right in the package*. Low gas penetration rate . . . inert and non-toxic.



METAL PARTS can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.



FREE FOLDER shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group. 3M Co., St. Paul 6, Minn., Dept OL-37

The term "SCOTCHPAK" is a trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario. © 3M Co., 1956.

3M COMPANY — DIVISION OF RESEARCH

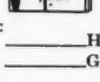
When inquiring check 2289 opposite last page

whether you need 1 or a carload

CALL ON INLAND FOR HIGH QUALITY STAINLESS STEEL DRUMS

If you ship chemicals, acids, pharmaceuticals, foods or other products that require the extra protection of stainless steel, it will pay you to check the many advantages of Inland Stainless Steel Shipping Drums. Manufactured in a range of sizes from 15 to 60 gallons, from many types of stainless steel, with double-seamed or all welded construction, with all modifications necessary to meet ICC specifications 5 and 5C. Inland can supply the right drum for your requirements . . . whether you need 1 or a carload!

One of Inland's Stainless Steel Shipping Drums. An ICC 5C drum, 55 gallon, 16 gage, all welded construction (flanges, heads, bottoms and side seams) I-bar rolling hoops. Many other sizes and types are available. Call on Inland for your process drums and stainless steel shipping pails too!



"The Use and Care of Stainless Steel Drums"

Here is a useful, new booklet. It gives valuable information on how to use and get maximum life from stainless drums and fully describes the Inland line. Send in this coupon for your free copy.

Also:

_____Have your representative contact me.

_____Give me a quotation on_____ICC_____Drums.

Name_____Title_____

Company_____

Address_____

City_____Zone_____State_____

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company • 6532 South Menard Avenue Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

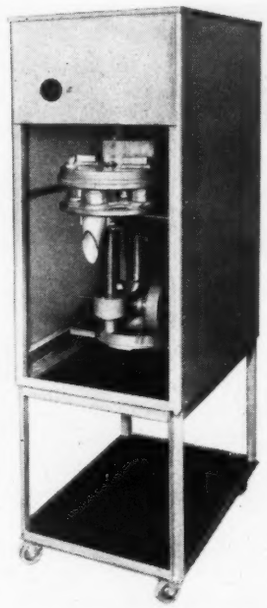
When inquiring check 2290 opposite last page

PACKAGING

Handles fragile products with minimum breakage . . .

volumetric filler handles drugs, powders, etc.

Uses: Unit is designed to minimize breakage and variation in filling operations on such products as drugs, powders, and other fragile and granular products.



Horizontal indexing of filler reduces product breakage and degradation

Features: Volumetric filling section does not rotate under stress of headweight. Indexing of filling head reduces breakage and degradation.

Description: Filling machine has spout designed to suit flow of product and the container to be filled. It can be made into a standard volumetric filler by use of additional standard hopper and collector plate, thus allowing filling of the various other products.

(Whiz-packer volumetric filler is manufactured by Frazier & Son, Dept. CP, 20 Industrial West, Allwood, Clifton, N.J. . . . or for more information check 2291 on convenient Reader Service slip opposite last page.)

LERMER PLASTIC CONTAINERS
Help You Make Satisfied Customers

- They are shatterproof, assuring long life.
- They are 75% lighter than glass, effecting enormous savings in shipping.
- They are available clear or opaque in a multitude of lustrous colors.
- They can be handsomely decorated and printed during manufacture to carry your story.

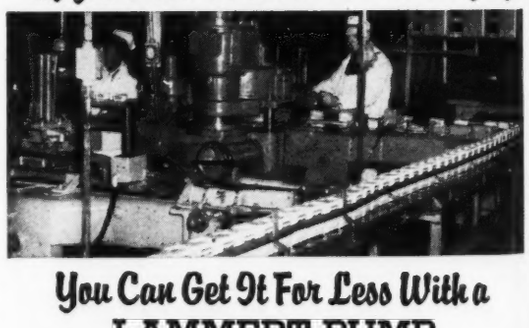
LERMER PLASTICS, INC. 530 South Ave. Garwood, N. J.

REPRESENTATIVES IN THESE CITIES: Rochester, Memphis, Miami, Cincinnati, Columbus, Cleveland, Chicago, Detroit, Minneapolis, San Francisco, Los Angeles, Toronto, Philadelphia

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS

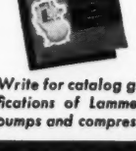
When inquiring check 2292 opposite last page

If you Need Vacuum For Packaging



You Can Get It For Less With a LAMMERT PUMP

Capacities from 4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).



Write for catalog giving specifications of Lammert Vacuum pumps and compressors.

LAMMERT & MANN CO., INC.
1753 Walnut Street, Chicago 12, Illinois, SEeley 3-0383

When inquiring check 2293 opposite last page

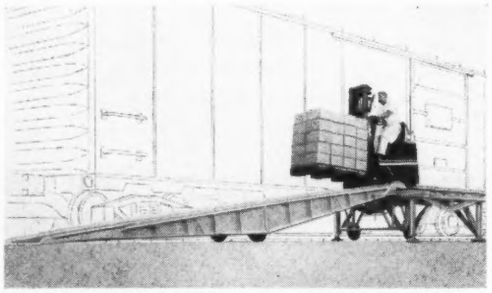
Movable lightweight platform attaches to mobile ramp for rail-car loading . . .

permits parallel loading where track-side space prohibits right-angle loading

Uses: For use in loading rail cars where track-side space is limited.

Features: Platform, constructed of light-weight magnesium, can be positioned by lift truck at car door.

Description: Engineered for load capacities up to 16,000 lb, movable platform measures 8 x 8'. It has diamond-tread, reinforced floor plate for safe traction.



Portable platform table and mobile loading ramp permit parallel loading of rail cars

In use, a mobile loading ramp is locked in place at side of platform, parallel to the track, and a dock-board bridges gap between platform floor and car entrance. Edges of platform deck are equipped with safety-curbs to prevent power truck run-off and eliminate tire damage. Safety-curbs are removable, permitting parallel loading from either side of rail car.

(Movable magnesium platform table is manufactured by Magline Inc., Dept. CP, 1900 Mercer St., Pinconning, Mich. . . . or for more information check 2294 on form which is located opposite last page.)

Slide rule facilitates selection of multiwall bag papers

Quick-selector is designed to simplify choice of multiwall bag papers for meeting individual needs. Slide rule gives properties, description of construction, and product packaging applications of papers providing protection against grease, oil, acid, alkalis, abrasion, bacteria, insects, and moisture and water damage.

Paper selector for multiwall paper bags is issued by St. Regis Paper Co., Dept. CP, 150 E. 42nd St., New York 17, N.Y. When inquiring specify 2295 on form opposite last page.

Have you met the

Fluid Flow "Five"?

Only Continental offers you a full line of "poly" nozzle, non-drip detergent cans

No matter how your liquid detergent sells best —in small-, medium-, or economy-sized containers—one of Continental's *five* Fluid Flow cans is tailor-made for you. Every member of this handsome package family gives you all these important selling points:

EVEN POURING, NO DRIPPING Threaded polyethylene nozzle permits free flow . . . provides exact, dripless cutoff when pour is completed.

WRAP AROUND LITHOGRAPHY Solderless construction frees every square inch of outside surface for colorful decoration—even domes and tops.

LASTING BEAUTY Resistant varnish prevents marring of lithography . . . protects your sales message from the time it leaves your plant until it's in the hands of the consumer.

TOP PRODUCT PROTECTION Newly-developed enamel linings will prevent raw metal from touching your liquid detergent.

NOZZLES IN COLOR Rainbow variety to match or contrast with any can design.

Let Continental's Fluid Flow "Five" start selling for you. Call soon.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

When inquiring check 2296 opposite last page

PROTECTIVE'S

DRUM LINERS • BAGS • CARTON LINERS

. . . all styles, all sizes, produced with fine materials: Polyethylene, Vinyl, Laminates and other flexible films — all at surprisingly LOW PRICES!

***Double-Seal Guaranteed Safety . . .**

SUCCESS!

"TWIN-SURE" DOUBLE-SEAL® *straight bottom liners*

"POWER-SEAL" *round bottom liners*

. . . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

. . . here are just a few users of protective liners:

Allied Chemical & Dye Corp.
The Borden Company
Brookhaven National Laboratories
C-O-TWO Fire Equipment Company
E. I. duPont de Nemours & Co.
Endicott Johnson Corp.
McKesson & Robbins, Inc.
National Lead Company
Chas. Pfizer & Co., Inc.
Swift & Company
Union Carbide & Carbon Corp.
U. S. Quartermaster Corps
General Electric Company

Guaranteed Satisfaction • Free Consultation • Free Samples Write Dept. CP-37

PROTECTIVE LINING CORPORATION

GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

*® TM

When inquiring check 2297 opposite last page

COLTON ROTARY PRESSES

CAPACITIES 65 TO OVER **5000** TABLETS PER MINUTE

MIXERS—GRANULATORS—OVENS

FOR HIGH PRODUCTION AT LOW COST

ARTHUR **COLTON** COMPANY

Established 1887

Div. Snyder Tool & Engineering Company

3516 E. LAFAYETTE • DETROIT 7, MICHIGAN

When inquiring check 2298 opposite last page

Uses roller for marking metal drums

Development of improved inks for marking on non-porus surfaces, and the use of rollers instead of brushes or sprayers, have been aimed at speeding up metal-drum stenciling procedures. Rubber rollers, available in three width sizes, are said to enable 100 to 500 markings with a single inking. Instant-drying ink is available in various colors.

Drum marking kit has roller for applying ink

(ROL-IT-ON stenciling systems are products of Diagraph-Bradley Industries, Inc., Dept. CP, PO Box 269, Herrin, Ill. Check 2299 opposite last page.)

How to select stands for vending displays

Pocket-size booklet of 36 pages shows how the vending display stand for packaged products can be tied in with overall merchandising efforts, how it can be designed to win dealer acceptance, and how it can be tailored to fit budget. Photographs show over 20 corrugated displays with descriptions of how each attained its specific objective.

No. 10 in "Little Packaging Library" series is issued by Hinde & Dauch, Dept. CP, Sandusky, Ohio. When inquiring specify 2300 opp. last page.

You can package it better at less cost in a Clearsite plastic container

- *1/5 the weight of glass*
- *Shatter-proof*
- *Easy to print*
- *Moisture tight, dust free*

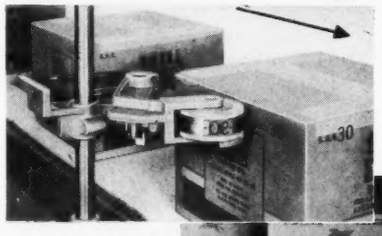
There is a wide variety of shapes, sizes, colors and closures available to give your particular product extra sales sparkle. Write for free samples and descriptive literature to Dept. G.

CELLUPLASTIC CORPORATION

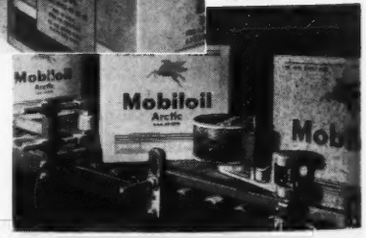
Sales and Executive Offices Newark, New Jersey

When inquiring check 2301 opposite last page

Low-cost marking attachments save thousands of $ every year



ROLACODER twin-action markers... for imprinting codes and lot numbers on 2 or 4 sides of cases simultaneously . . . without requiring cases to be turned.



ROLACODER single-side marker for accurate spot imprinting of brand names, varieties, codedates, lot numbers on cases, cartons, fibre drums, bags, etc.

Friction-driven ROLACODER markers do your marking automatically . . . save cost of manual stencilling or stamping. Designed for easy do-it-yourself installation on existing conveyor lines, case-sealers, etc. They use quick-change rubber type or dies, hold 8-hour ink supply.

See them in action . . . Booth 1138
National Packaging Exposition · Chicago, April 8-11

Gottscho **ADOLPH GOTTSCHO, INC.**

Dept. W, Hillside 5, N. J.

Automatic Production-Line CODING, MARKING, IMPRINTING MACHINES
In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

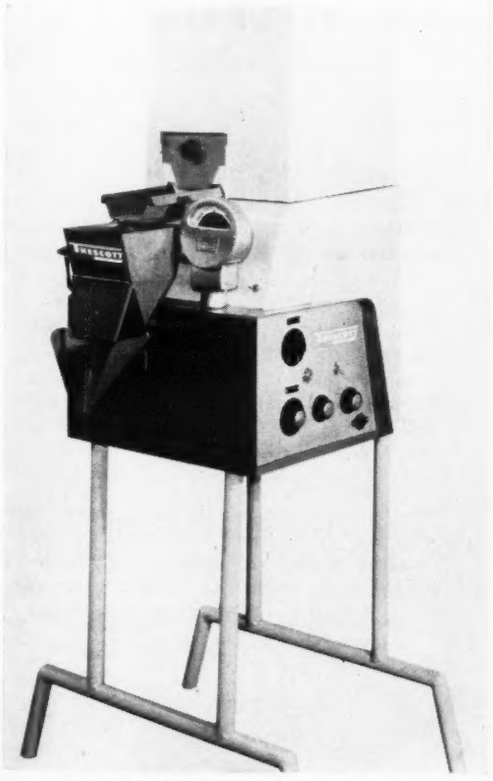
When inquiring check 2302 opposite last page

Fills 1- 5-lb packages — up to 30 per minute

Uses: Filler handles powders, pellets, all dry, flowable materials.

Features: Vibratory feeder has fast feed and dribble finish. Scale reads in 1/16 ounces and electronic controls (photoelectric cells) are used so that there is no effect on action or reading of scale.

Description: Unit may be used as net weigher: material is preweighed in automatic dump hopper and then discharged into container. Dial of scale is visible and at any time operator may press



Scale reads in increments of 1/16 of an ounce

check weigh button so that weighed load is retained in dump hopper and weight checked without appreciable delay. Adjustable container shelf may be used when it is desired to weigh directly into the package.

Mating unit of scale is adjustable elevator to feed material to vibrator trough. When feed from elevator is matched to that of weigher and elevator synchronized with weigher, even flow is obtained.

(Trescott model B weighing and filling machine is manufactured by The Trescott Company, Dept. CP, Fairport, N.Y. Check 2303 opposite last page.)

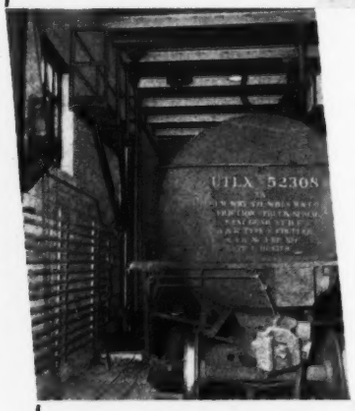
VULCAN
. . . a carton or carload, Vulcan ships fast."
. . . size is no problem, Vulcan makes 1 through 15 gallons."
. . . and HiBake interior linings for product protection."
. . . Vulcan's prompt deliveries cut warehousing costs."
Over 40 years Container Experience
VULCAN
CONTAINERS INC.
Bellwood, Illinois
(Chicago Suburb)
Phone Linden 4-5000
In Canada:
Vulcan Containers Ltd.
Toronto 15, Ontario
Representatives in all principal cities
See "Pails" in Classified Phone Directories

When inquiring check 2304 opposite last page

For Every Tankcar Loading or Unloading Situation A NECO SAFETY PLATFORM

OUTSIDE

Handling vinyl acetate monomer at Air Reduction Chemical Company, Calvert City, Kentucky. This NECO 2A platform can be turned manually — has retractable deck and stainless steel piping, automatic foot brake and explosion proof lighting fixtures.



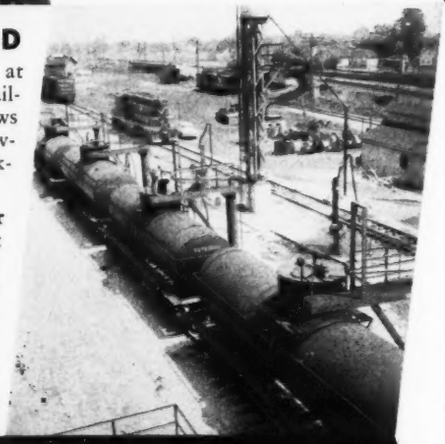
INSIDE

Unloading liquified paraffin at Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan. This NECO 3NT platform can be raised or lowered hydraulically—fits narrow clearance conditions.

ALL AROUND

Unloading diesel fuel at Chesapeake and Ohio Railway, Detroit, Mich. Shows orderly arrangement of several NECO 2A Safety Tankcar Platforms.

For greater safety, higher morale and more efficient loading and unloading of any type of liquids — let the Nichols Safety Tankcar Platform serve your company. Get full details today.



NICHOLS ENGINEERING CO.

3816 W. GRAND AVE., CHICAGO 51, ILLINOIS

SERVING INDUSTRY SINCE 1894

When inquiring check 2305 opposite last page

Unloading dry sulfur, a hazardous and unpleasant job, has disappeared from Kimberly-Clark's paper mills, since switching to . . .

SAFER OPERATIONS WITH MOLTEN SULFUR

Problem: Unloading dry sulfur from gondola-cars was a hard, manual operation at the Kimberly and Niagara paper mills. The unpleasant job called for men using shovels and wheelbarrows to transport the dry sulfur from the cars to conveyors. To protect themselves from the dust, the men had to wear bulky protective clothing, gloves, and respirators . . . "Men from Mars", they were called.

Then there was always the danger of fire and explosion. Aluminum shovels were made standard equipment to avoid danger of sparks.

(Sulfur is used in paper making to produce acid for sulphite pulp. It is burned to form sulfur dioxide gas, which is bubbled through lime water to form acid for digesting wood chips.)

Solution: Dry sulfur problem had been the concern of the Kimberly-Clark people for some time. Someone remembered that, in sulfur mining, live steam is injected into the ground to melt the sulfur and pump it out in liquid form to tank cars. The cars haul it to storage areas where it is pumped out onto the ground and allowed to harden. From there it is shipped to the mills.

Why not, they thought, ship it directly in the liquid state? If sulfur could be handled in enclosed systems, then the hazards would be minimized. Arrangements were made and a tank car was rented. Trial run proved system to be just

To handle dry sulfur, operators had to wear protective clothing and respirators

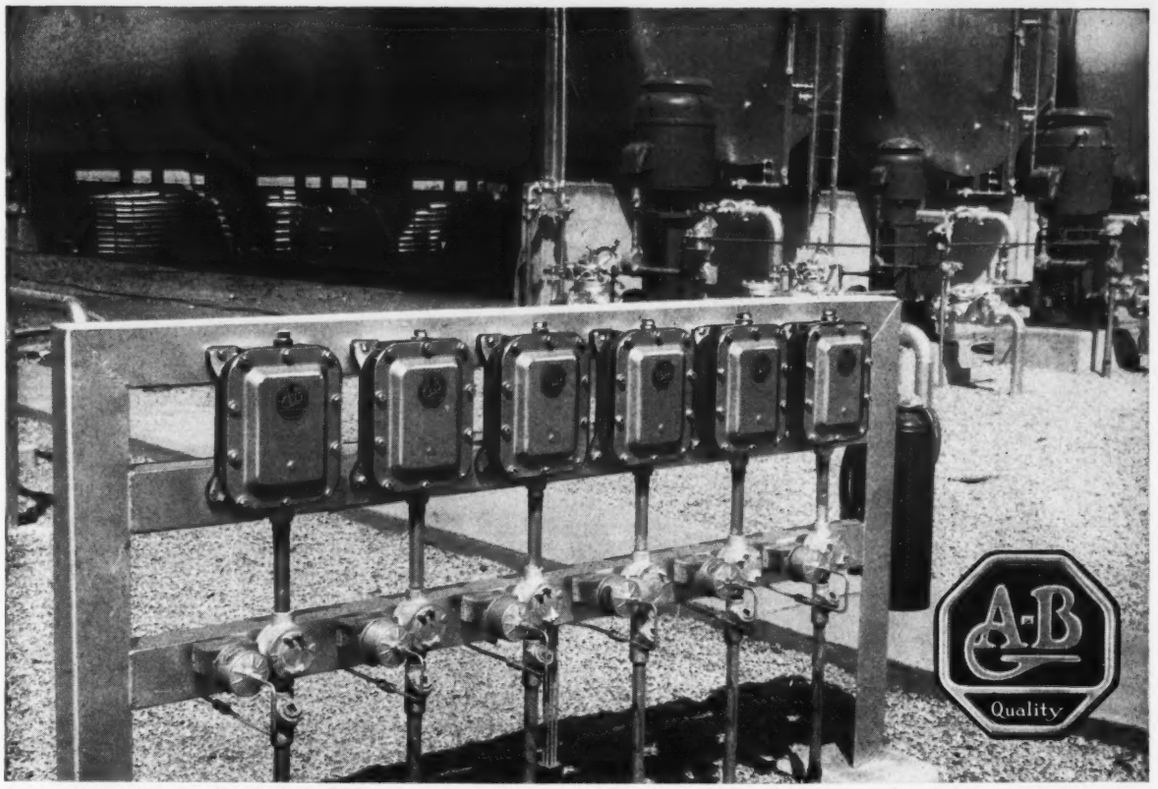
the thing. Storage and handling operations were designed and operation put to work. The tank cars are lined with steam coils for melting the sulfur when necessary. At the Niagara plant the storage tanks have controlled heating systems, while at the Kimberly plant the sulfur is used directly from tank cars.

Results: Strangely-clad men are no longer a part of the scene. Operators can now work safely at unloading. The atmosphere has improved.

Rental costs of the 27 tank cars used to handle liquid sulfur have been offset by the savings in waste and handling. Seventy tons of liquid sulfur can be handled in one tank car compared to fifty dry tons in a gondola.

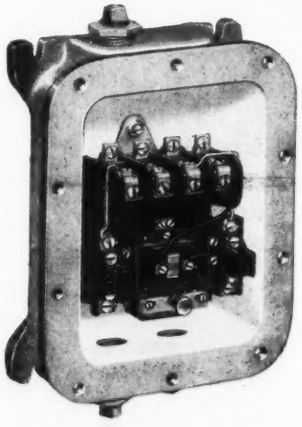
(Material for this story was furnished by Kimberly-Clark Corporation, Neenah, Wis.)

Liquid sulfur is pumped directly from tank cars to storage tanks. Handling system is completely enclosed



A row of six Allen-Bradley Bulletin 709 automatic explosion-proof starters on loading pumps of an L.P.G. processing plant

FOR SAFE AUTOMATIC MOTOR OPERATION
in Hazardous Locations *Specify* Allen-Bradley Explosion-proof Solenoid Starters



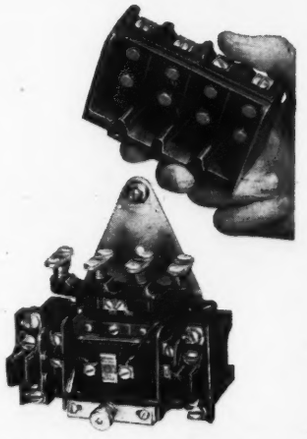
Bulletin 709 Solenoid Starter
Allen-Bradley Size 1 solenoid starter in a NEMA Type 7 enclosure for operation in hazardous gas locations. The cover and base have wide machined flanges.

It takes a lot of maintenance time to open and replace bolted covers of explosion-proof starters. That's why it is important to specify Allen-Bradley solenoid starters . . . which are good for millions of operations without contact maintenance. The thermal overload relays can be reset without opening the enclosure.

Reduce your plant maintenance by using Bulletin 709 solenoid starters. You can install them . . . and forget them. Write for the Allen-Bradley Handy Catalog . . . a valuable guide for selecting motor controls and enclosures for every type of industrial service.

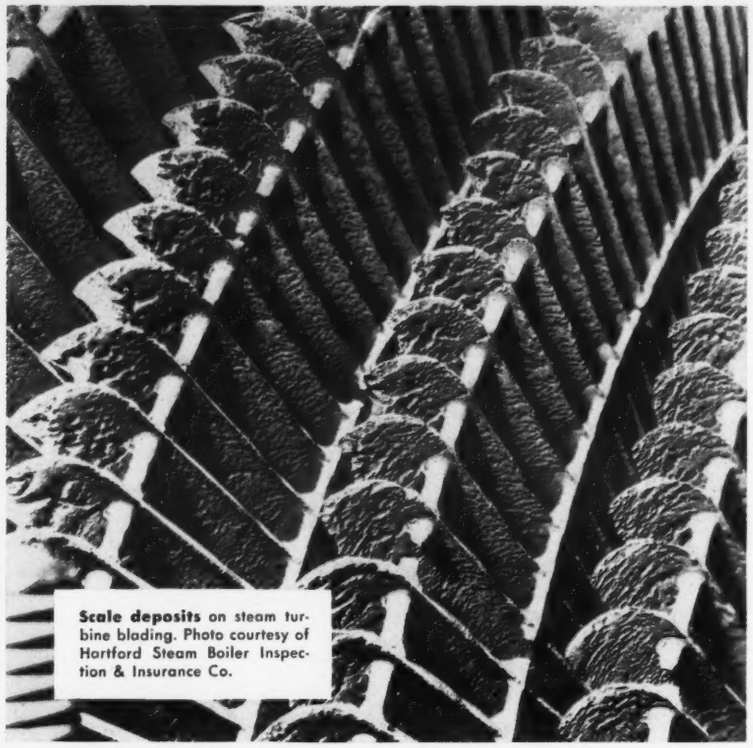
Allen-Bradley Co.
104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY



Double Break, Silver Alloy Contacts
Arc hood lifted to show double break, silver alloy contacts on solenoid plunger and in arc hood. The basic solenoid design of all Bulletin 709 ratings is identical.

When inquiring check 2306 opposite last page

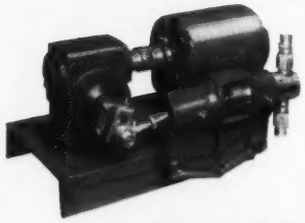


Scale deposits on steam turbine blading. Photo courtesy of Hartford Steam Boiler Inspection & Insurance Co.

No Build-Up! No Blow-Up!

. . . WHEN MODEL 1106 PROPORTIONEER FEEDS BOILER WATER CHEMICALS

Prevent scale build-up (caused by boiler carry-over) on turbine blades with proper raw water or internal steam boiler treatment. Model 1106 Proportioneer feeds all chemicals (alkaline, neutral, or acid) accurately (guaranteed within ±1%) over 15 to 1 range. Capacities range from 0.11 to 35.6 GPH . . . for discharge pressures up to 1100 psig.



PAY LESS, GET MORE!

Design features of this proportioning pump include interchangeable measuring cylinders, super-accurate Vane-Guide check valves, and percentage calibrated stroke-length scale.

Request Bulletin 1106-2 for complete data. Write to PROPORTIONEERS, INC., 387 Harris Avenue, Providence 1, Rhode Island.

PROPORTIONEERS, INC.
DIVISION OF
B-I-F INDUSTRIES
PROVIDENCE, RHODE ISLAND
METERS FEEDERS CONTROLS

When inquiring check 2307 opposite last page

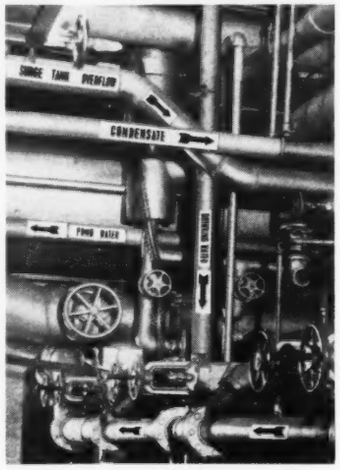
SAFETY

Pipe identification system indicates hazards

Uses: To provide uniform pipe identification system.

Features: Markers will remain stuck to pipes as hot as 300°F.

Description: Vinyl-cloth adhesive markers come in sizes from 1⅛x3½" to 2¼x14". Markers conform to ASA specifications.



By identifying all lines, showing direction of flow, and indicating shutoff points markers save valuable time in emergencies

(Pipe identification markers are product of W. H. Brady Co., Dept. CP, 727 W. Glendale Ave., Milwaukee 9, Wis. Check 2307A opposite last page.)

Less water to fight fires with aid of additive

Four-page bulletin tells of wetting, penetrating, and foam-forming agent as additive to water for increased efficiency in fighting Class A and Class B fires. Compatible with naturally occurring waters, substance withstands temperatures as low as −20°F without freezing.

"New, Improved Unox Penetrant" is issued by The Unox Co., a division of McFarland Manufacturing Corp., Dept. CP, 1630 Roberts St., Houston 3, Tex. Check 2308 opp. last page.

Drive out
FOUL AIR
Blow in
FRESH AIR
with Coppus Type A Ventilator

Assure greater safety, comfort for workers . . . get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. *Supply fresh air continuously.*

Send now for further information. Coppus Engineering Corporation, **383 Park Avenue,** Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.

ANOTHER **COPPUS** "BLUE RIBBON" PRODUCT

When inquiring check 2309 opposite last page

NEW! Tissue-Thin Pylox™ Gloves

Nimble Fingers™ by PIONEER

Thinner than surgical gloves for jobs requiring extreme finger sensitivity. Wear all day in comfort. Resists normal acids, alkalis, oils, greases, some solvents. Smooth outside, textured inside . . . reversible for non-slip grip. Sizes small, medium, and large. Let PIONEER help you select proper gloves for your job from the complete PIONEER line.

The PIONEER Rubber Co.
241 Tiffin Road, Willard, Ohio, U.S.A. V-10

Please send me:
The name of my nearest PIONEER Glove Distributor.
1956-57 PIONEER Industrial Glove Catalog.
Hand Protection Clinic glove recommendation for job described in enclosed letter.

Firm_____
Address_____
City_____ Zone____ State____
Signed_____

Mail This Coupon Today

When inquiring check 2310 opposite last page

Checks airborne radioactivity and gives warning . . .

will operate for seven to ten days unattended, providing a permanent record of radiation

Uses: As mobile air monitor for automatically measuring and recording airborne radioactivity, providing warning by light and bell when preset limits are exceeded.

Features: Monitor will operate for seven to ten days unattended, providing a permanent legal record of radiation levels on a continuous chart.

Description: Air monitor easily detects maximum permissible concentration of airborne alpha, beta and gamma activity as specified in National Bureau of Standards handbook 52. Instrument will follow either short term high level radioactivity, or more slowly changing low level radioactivity. Airborne particles are collected on a filter which may be operated as a fixed filter to provide an accumulative record. It can also be operated as a continuous moving filter with several speed choices for showing instantaneous changes.

Air monitor protects personnel wherever radioactive materials are handled

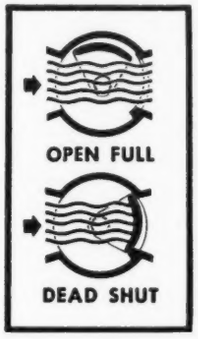
Instrument has a flexible collecting and counting arrangement. Unit permits continuous immediate counting, delayed continuous counting, immediate step-wise counting, or delayed step-wise counting.

Monitor has a variable air flow, positive-displacement pump, high-stability count rate meter, variable-speed chart recorder, and two-inch thick lead counting chamber. Overall dimensions are 47½x19x37½". Weight is approximately 600 lb.

(Model AM-3A air monitor is product of Nuclear Measurements Corporation, Dept. CP, 2460 N. Arlington Ave., Indianapolis 18, Ind. . . . or for more information check 2311 opposite last page.)

WHY RISK *Contamination* FROM *Lubrication?*

DeZurik Plug Valves eliminate the danger of contamination from valve lubricants. They operate easily, without lubrication — without "freezing" — with a quarter turn of the lever. No greases to stock, no fittings to buy, no gauges and guns to maintain. DeZurik Easy-Operating Non-Lubricated Plug Valves are complete in themselves.



ECCENTRIC ACTION

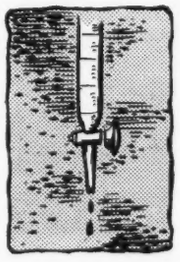
DeZurik Valves operate on an exclusive eccentric principle. The resilient-faced plug is pivoted eccentrically in the valve body and contacts the seat ONLY IN THE CLOSED POSITION! As the valve is closed, the plug is swung across and against the seat with a cushioned closure that seals tight despite solids in the flow. In opening the valve, the plug is backed away and to the side in an e-a-s-y quarter turn. No need to jack the plug loose with lubricants, no risk of contaminating the flow!

DRY SOLIDS

Because lubricants are not present in DeZurik Valves, granular material may be handled without special problems.

LIQUIDS

From the thinnest solutions to the thickest slurries, DeZurik Valves handle liquids without leakage, with a minimum of maintenance.



GASES

Lines handling gases under pressure present no problems for DeZurik Valves. The same dead-tight closure is obtainable.

For highly corrosive services, a full range of valve materials and special plug facings are available. Write for details.

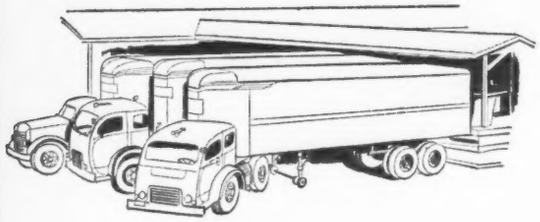
DeZURIK CORPORATION
SARTELL, MINNESOTA

DeZurik Corporation
Dept. CP-3
Sartell, Minnesota

Please send me more information regarding DeZurik Valves on (service) .....
NAME .....
COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

When inquiring check 2312 opposite last page

Roy Fruehauf, President, Fruehauf Trailer Company



"Business Publications Are Vitally Important To Me..."

says Mr. Fruehauf. "Frequently I find facts and ideas in business publications that help me to make important decisions. We know our customers and prospective customers read *their* business magazines, too. We carry substantial advertising schedules in several different groups of business periodicals."

It is good thinking to judge an advertising medium by the value its editorial pages deliver to regular readers. Business publications provide a direct sales route for any product or service of benefit to business or professional men.

NBP

NATIONAL BUSINESS PUBLICATIONS, INC. 1001 Fifteenth Street, N. W., Washington 5, D. C. • STerling 3-7535

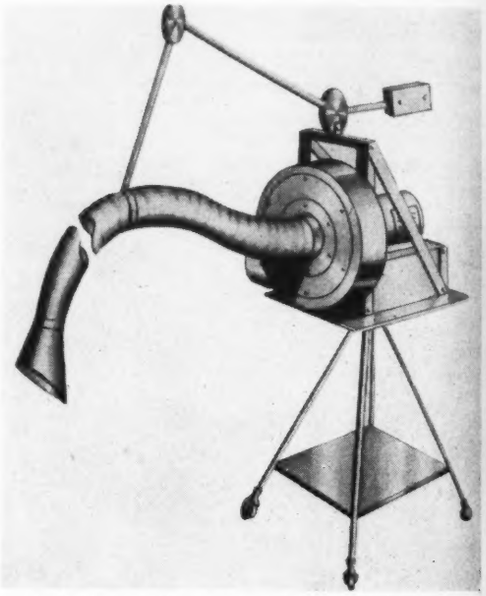
The national association of publishers of 171 technical, professional, scientific, industrial, merchandising and marketing magazines, having a combined circulation of 4,049,550... audited by either the Audit Bureau of Circulations or Business Publications Audit of Circulation, Inc.... serving and promoting the Business Press of America... bringing thousands of pages of specialized know-how and advertising to the men who make decisions in the businesses, industries, sciences and professions... pin-pointing your audience in the market of your choice. Write for list of NBP publications and the latest "Here's How" booklet, "How Well Will We Have to Sell Tomorrow?" by Ralston B. Reid, Advertising & Sales Promotion Manager, Apparatus Sales Division, General Electric Company, Schenectady, N.Y.

Quick set-up for fume exhaust — unit can be rolled to job

Uses: Mobile exhaust unit is designed to remove fumes from locations not tied in with fixed exhaust systems.

Features: Movable on steel casters. Has high suction.

Description: Units contain gasoline or electrically driven blowers capable of moving up to 800 cfm. 8-foot stainless steel hose assembly includes arms and counterbalance for universal positioning. Available hose diameters are 4, 6 and 8".



Mobile fume exhauster goes directly to fume site and pushes fumes out to external atmosphere

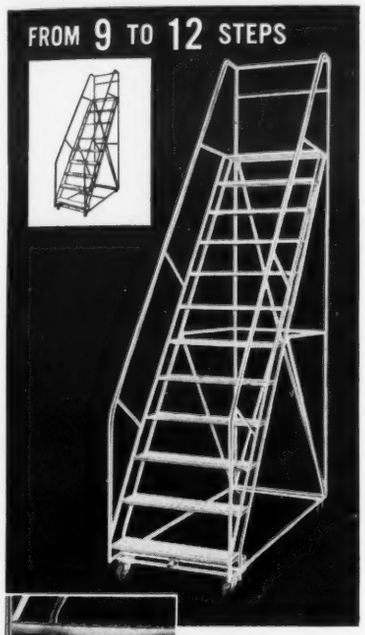
(W-200-50 stand-type exhausters are manufactured by Engwald Corp., Dept. CP, 357 Lafayette Ave., Brooklyn 38, N.Y. Check 2313 opp. last page.)

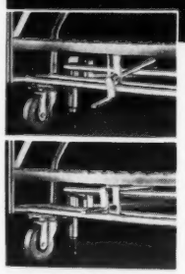
Illustrates safety lights and safety cans

Lights for safe use in explosive areas, and lights for use by railroad, utilities and industry personnel, are illustrated and described in 16-page, three-color catalog. Table allows choice of battery and lamp combinations according to amount of light and length of battery life needed. Accessories and parts for all models are listed. Section on cans for the safe handling of flammable liquids is included.

Cat 566 is issued by Justrite Manufacturing Company, Dept. CP, 2061 N. Southport Ave., Chicago 14, Ill. Specify 2314 opposite last page.

WORK AT
HIGH LEVELS SAFELY...
ON BALLYMORE "Hi-boy" SAFETY-STEP LADDERS





FOOT-OPERATED BALLYLOCK
Step-on brake casters on front of ladder grip floor . . . prevent ladder from rolling, wobbling or "kicking out." When pedal is released, Ballylock quickly retracts by spring action.

Strong, safe, and easily moved about, Ballymore "Hi-boy" Step Ladders provide sure support at extra-high working levels—up to 15 feet!

All-welded steel construction . . . rust-resistant aluminum finish. Smooth-rolling casters provide complete mobility. Rugged step-on Ballylock extends front legs for firm, stable floor contact.

Four sizes, six models to choose from—each with sturdy handrails. Three types of non-slip tread construction.

Write today for complete specifications to Ballymore Company, West Chester 10, Pa.

BALLYMORE LADDERS

THE STANDARD BY WHICH SAFETY LADDERS ARE JUDGED

When inquiring check 2315 opposite last page

Hydraulically operated rescue gear speeds release of trapped victims . . .

portable kits can be used to push, pull, or spread with tons of force

Uses: Equipment aids in extricating victims from fallen debris, collapsed machinery, wrecked vehicles, or other entrapments. It can also be adapted for industrial maintenance applications.

Features: Remote operation makes equipment safe and effective in hazardous or cramped areas.

Attachments allow equipment to be used in many different positions

Description: Units are available in four standard kits of 4-, 10-, and 20-ton capacities. Kits include hand-operated pump and ram, joined by flexible hose to permit remote control operation of the ram. Attachments for lifting, pushing, pulling, spreading, clamping, and pressing are included. Weight of standard kits ranges from 48 to 244 lb. Other hydraulic tools are available up to 100-ton capacity. None of the equipment requires an outside source of power.

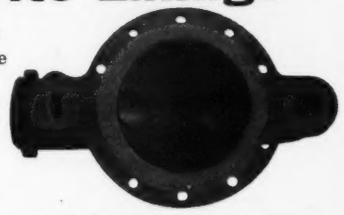
Portable hydraulic tools are used for industrial maintenance applications as well as rescue operations

("Porto-Power" rescue equipment is manufactured by Blackhawk Mfg. Co., Dept. CP, 5325 W. Rogers St., Milwaukee 46, Wis. . . . or for more information check 2316 opposite last page.)

Give the boot to corrosion

...with La Favorite Linings

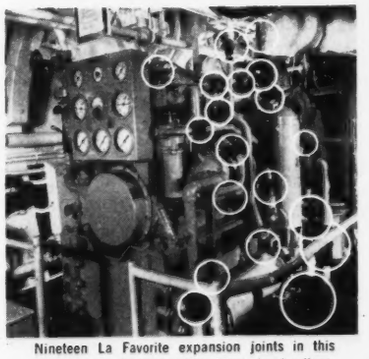
Processing equipment, conveying lines and accessories, storage tanks—all give new equipment performance when you boot out corrosive attack and related evils that bedevil production schedules. Armor inside surfaces with La Favorite high-strength-bond elastomer linings. It's profitable. *For details, ask for Bulletin No. 55.*



Typical of the intricate shapes lined with La Favorite protective elastomer compounds.

Give the boot to tremble and shake ...in pipe and duct lines

La Favorite all-rubber expansion joints give the boot to the tremble and shake in fluid conducting lines—take up stretch and shrink—give your duct and piping lines a calm performance that delays the point of no return. Details in data sheet—yours on request.



Nineteen La Favorite expansion joints in this naval power plant block the shivers in pipe lines.

LA FAVORITE Rubber Mfg. Co.
267 Wagaraw Road • Hawthorne, New Jersey

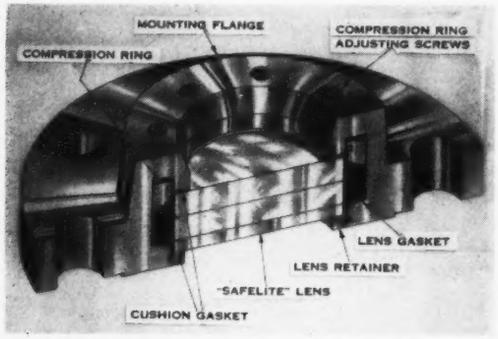
When inquiring check 2317 opposite last page

Permits safe viewing into pressure vessels

Sight glass has double-pressure glass discs in lens and durable mounting and sealing

Uses: Sight-glass lens and mounting designed for safe observation of contents of pressured vessel.

Features: Lens is designed with double-pressure glass discs, each having safety factor of 10. Either disc can hold full rated flange pressure of mounting should the other be broken. Shielding disc



Cushioned mounting of lens eliminates possibility of damage during sight-glass installation

protects pressure discs from acids, and colored disc can be used as protection from intense light rays. Lens and mounting are furnished with special drilling for adaptation to equipment in use.

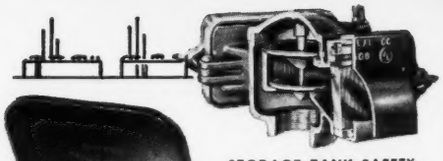
Description: Adaptable for all vapor and liquid service within limits of flange-mounting material selected, unit is safe for temperatures from −20 to 400°F, and from full vacuum to standard rated working pressure of flange series. Sighting area varies from 2⅞" to 7⅝" in both 150- and 300-lb standard forged-flange mountings. Lens is positioned in flanged body with non-extrudable top and bottom cushion gaskets, and surrounded with specially designed packing. The two pressure glass discs and shielding disc are bonded together. High-temperature clear plastic interlayers prevent entrance of condensation or dust between glass discs, and allow movement due to difference in coefficient of expansion.

Compression ring and cushion gaskets provide resilient lens mounting, eliminating danger of breakage during installation of unit on pressured vessel.

("PresSure" lens and mounting are manufactured by PresSure Products Company, Dept. CP, PO Box 424, Charleston 22, W. Va. . . .or for more information specify 2318 on form which is located opposite last page.)

NEVER UNDERESTIMATE THE

LABORATORY EQUIPMENT—A specialized line which facilitates lab handling operations. Available in stainless steel and other special metals. Shown is the Disposal Can for waste liquids.



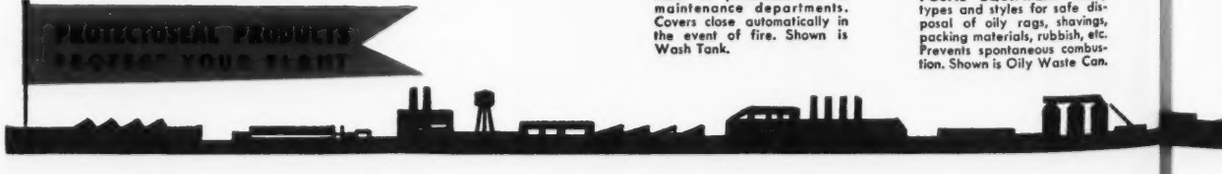
STORAGE TANK SAFETY VENTS—All types of flammables storage tank safety fittings: Non-conservation and Conservation type vents with flame arresters, steam-traced venting equipment. Shown is Conservation type vent.

STORAGE AND DISPENSING EQUIPMENT—Many types and sizes available for safe inner-plant storage and controlled dispensing. Shown is Stor-por dispensing can with flexible hose.

PRODUCTION CONTAINERS FOR BENCH USE—More than 20 different types and sizes for cleaning, washing, swabbing machined parts. Eliminates open solvent cans on assembly line. Shown is Swab Can with auxiliary supply tank.

LARGER PRODUCTION AND MAINTENANCE UNITS FOR FLOOR OR BENCH USE—Large capacity dip and wash tanks for production line or maintenance departments. Covers close automatically in the event of fire. Shown is Wash Tank.

FLAMMABLES WASTE DISPOSAL EQUIPMENT—Many types and styles for safe disposal of oily rags, shavings, packing materials, rubbish, etc. Prevents spontaneous combustion. Shown is Oily Waste Can.



DANGER OF FLAMMABLES!

. . . the path of an EXPLODING OIL DRUM

Fire in the storage area caused a build-up of internal pressure in the oil drum—it quickly became a flaming projectile that spread the fire far beyond the company enclosure and endangered life and property over a wide area.

This graphically illustrates only one of the dangers inherent in all flammable liquids wherever stored or used. ***Never underestimate the danger of flammables!*** Even the smallest quantity of a flammable liquid must be regarded as a potential hazard and should be safeguarded by observing certain fundamental principles. Regardless of the plant operation involved—storage, transfer, use, or waste disposal—basic engineering provisions for closed systems, flame arrested openings and pressure and vacuum relief must be made.

When carefully observed, these measures guard against the hazards of flammable liquids and permit the safe, economical and productive use of flammables within the plant.

Fire Engineering Services

The Protectoseal Company maintains a national field organization of Safety Engineers whose broad experience qualifies them to detect flammables hazards in all phases of plant operation and to make recommendations for removing these hazards in an approved and economical manner. This field service is backed-up by a highly specialized engineering staff with the ability to develop fire preventive equipment to meet individual requirements. Both the field and headquarter staffs are closely attuned to the work-a-day problems of flammables users.

Technical Publications Services

Check the coupon for the free, flammables safety guides you require, and the special series now appearing in the Protectoseal Safety Bulletin on "Flammable Liquids—their characteristics, hazards and safe handling." Then, if you do not find the answers to your problems, write direct to the Technical Service Department for their help.

Working to prevent fires in cooperation with Underwriters' Laboratories, Inc., Associated Factory Mutual Fire Insurance Companies, National Fire Protection Association, Factory Insurance Association, Improved Risk Mutuals.

PROTECTOSEAL

Since 1922 . . . Pioneering in the manufacture of SAFETY DEVICES for Hazardous Liquids

West Coast Warehouse: Los Angeles, Calif. In Canada: Safety Supply Co., Toronto

Fill in coupon and attach to company letterhead.

Flammables Information Guides to the Selection of Fire Preventive Devices for Safe Storage, Transfer and Use of Flammable Liquids.

THE PROTECTOSEAL COMPANY, Technical Service Department,
1932 So. Western Avenue, Chicago 8, Illinois

Please send the following Flammables Safety Guides with Price Lists, and the Safety Bulletin Series as checked below:

☐ Safety Can Catalog ☐ Drum Storage and Dispensing Catalog ☐ Vent and Fitting Storage Tank Catalog
☐ Safety Bulletin Series on "Flammable Liquids,—"their characteristics, hazards, and safe handling.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

When inquiring check 2319 opposite last page

Reduces water damage with shut-off . . .

stored-pressure water extinguisher has 2-A rating

Uses: In extinguishing Class A fires on wood, paper, rags, and so forth.

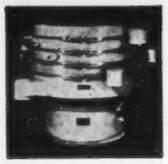
Features: Fire extinguisher can be turned off and on as needed, reducing water damage to a minimum.

Description: Fire extinguisher operates on air pressure. No bouncing or inverting is needed to activate the unit. Water stream, supplied by full capacity air pressure from start to finish, has a range of 35 to 40 feet. After use, extinguisher can be quickly recharged by replacing water and pressurizing the unit to 100 psi. Tri-color pressure gage indicates whether air pressure is adequate to discharge unit effectively.

Extinguisher has a $2\frac{1}{2}$-gal capacity. Underwriters' Laboratories has classified the unit 2-A. When anti-freeze chemical is added, fire extinguisher will operate properly in temperatures down to $-40°$F. Extinguisher is available in three different shells—stainless steel, brass, and chromium-plated brass.

(Stored pressure extinguisher is product of Ansul Chemical Company, Dept. CP, Marinette, Wisc. . . . or check 2320 on form which is located opposite last page.)

"Burbank, I've had a change of heart. Go ahead and take the afternoon off!"



If your Process Plant requires high-speed screening of any materials through 10-325 mesh...

SWECO can help you
CUT SCREENING COSTS 25%-80%

Here's how:

STEP 1 **Get the facts.** Send for SWECO Engineering data files on screening operations similar to yours. (No cost or obligation.)

STEP 2 **Define your screening problem.** Fill out and send in a SWECO Process Specification Sheet for analysis and recommendations by SWECO Engineering. (No cost or obligation.)

STEP 3 **Pilot test runs in your plant.** The SWECO resident engineer in your area will work out process and equipment details and refinements in your own plant. (No cost or obligation.)

STEP 4 **In-plant Process-proved performance** data from Step 3 becomes the basis for installation planning and purchase.

44% of the largest U. S. Firms are satisfied users of SWECO Separators. Uses cover 241 different materials, wet and dry, coarse and fine, heavy and light. Comparative efficiency varies from 2-to-1 to 10-to-1 per square foot of screen area. User data and references for any industry on request.

Here's Why SWECO Customer Result Stories Often are "Trade Secrets!"

"Reclaiming caustic solution–formerly waste."
Milwaukee Brewer

"936% more efficient–by test."
Chemical Company

"Ten minutes to change or clean screens."
Fish Processor

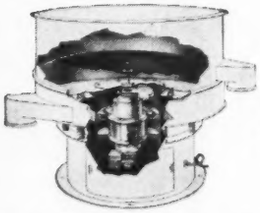
"Four SWECOS save us $100 per day."
Limestone Manufacturer

"Nets $40/hour in recovery of process waste."
Grain Processor

"We save $75.00 daily with two SWECOS."
Stone Products Company

"Turned process headache into profit item."
Northwest Fruit Processor

"The SWECO paid for itself the first time it was used."
Major Oil Company



SWECO "3-D" SCREENING ACTION tumbles material in three directions at once . . . increases efficiency as much as 10 to 1.

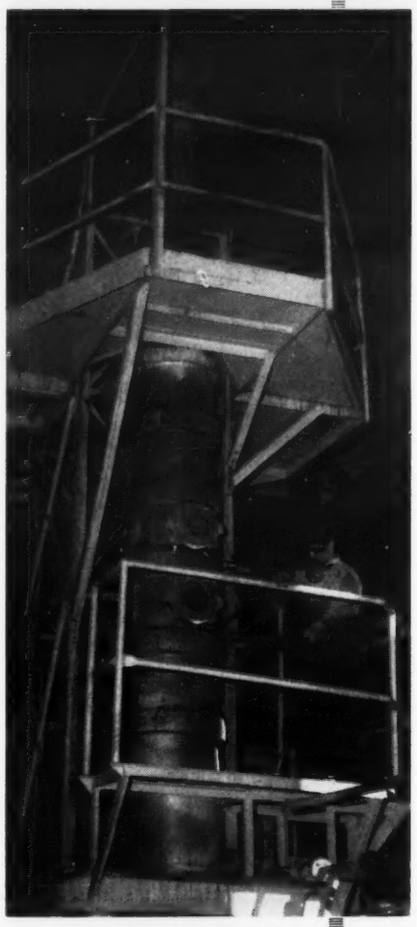
Free screening analysis and recommendations . . .

SWECO *District Engineers are available to make detailed analyses and recommendations on specialized screening operations without cost to you.*

Send for Bulletin 74-3

SWECO
Southwestern Engineering Company
4800 Santa Fe Ave., Los Angeles 58, Calif. LUdlow 3-6262
Engineers and Constructors...Manufacturers

When inquiring check 2321 opposite last page



Compact absorber is constructed of chemical stoneware sections, is 18" in diameter, 13' high.

Cramped quarters making process improvements difficult in your plant? Installing more compact and efficient equipment may be the answer . . . as in the case of this plant where it solved problem of . . .

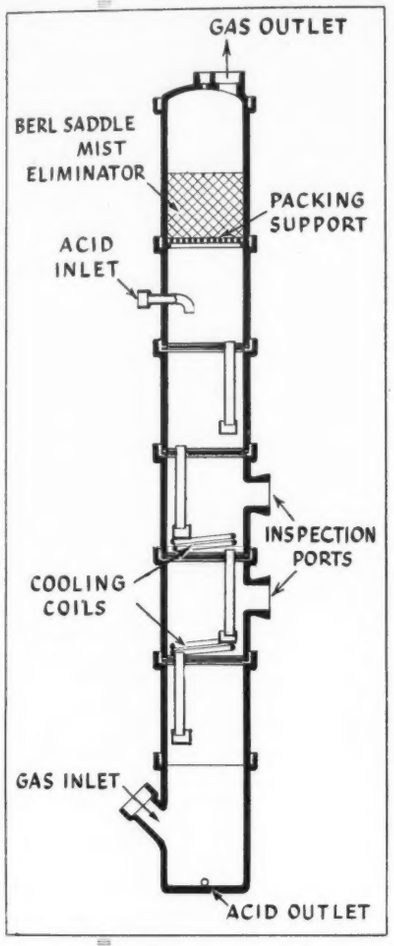
DRYING CHLORINE in LIMITED SPACE

TED F. MEINHOLD, Associate Editor
H. G. BURBIDGE, Gas Scrubbing Engineer
Aluminum Company of Canada, Limited

Problem: Dust and other foreign particles present in chlorine gas were causing processing difficulties at the Arvida, Canada, works of the Aluminum Company of Canada, Limited. Not only did the impurities interfere with the normal use of the chlorine: manufacture of magnesium chloride, or disposal by burning with hydrogen to produce HCl; they also prevented liquefaction of the chlorine, and interfered with the operation of the compressors used to transfer the chlorine.

The impurity problem was solved by installing an impingement baffle-tray water scrubber. This cleaned the gas, but created another problem — drying the chlorine. Space available for any additional equipment was definitely limited. Investigation showed that a conventional stoneware tubular cooler and four 4'-diameter by 30'-high sulfuric-acid-type adsorbers would probably do an efficient drying job, but the space requirements of this equipment disqualified it. A more efficient and compact unit was needed.

Solution: A compact, single-column, sulfuric-acid-type absorber was installed that could dry the 450 cfm of chlorine gas from saturation at 90°F, without the use of separate pre-cooling equipment. To remove the heat of absorption, water cooling coils are located right inside the tower. The unit is constructed of chemical stoneware sections (see drawing) and measures 18" in diameter and 13' high. The drying column contains four impinge-



Drawing shows design of chlorine gas dryer installed at the Arvida works of Aluminum Company of Canada, Limited

ment baffle trays, similar to those used in the scrubber. The absorption efficiency of these trays is much greater than that of the more or less stagnant pools of acid on the trays in the larger conventional cascade towers.

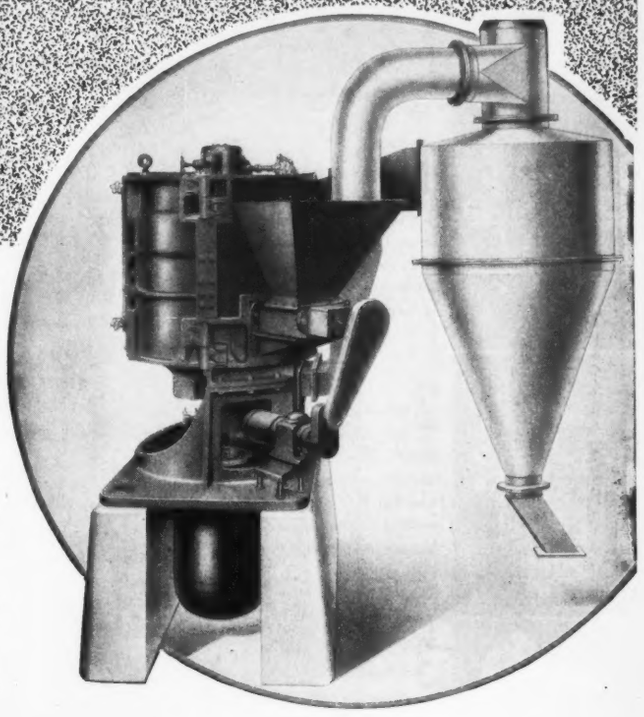
The bell and spigot design of the stoneware provided a simple way of supporting the impingement baffle trays. The trays are fabricated of Hastelloy "C". Water cooling coils are also constructed of this corrosion-resistant material and are located on the lower two trays. A berl saddle mist elimination packing was placed in the top of the tower to prevent carry-over of the acid.

In operation, a small amount of 98% sulfuric acid

(*Please turn to next page*)

HIGH-FINENESS PULVERIZING

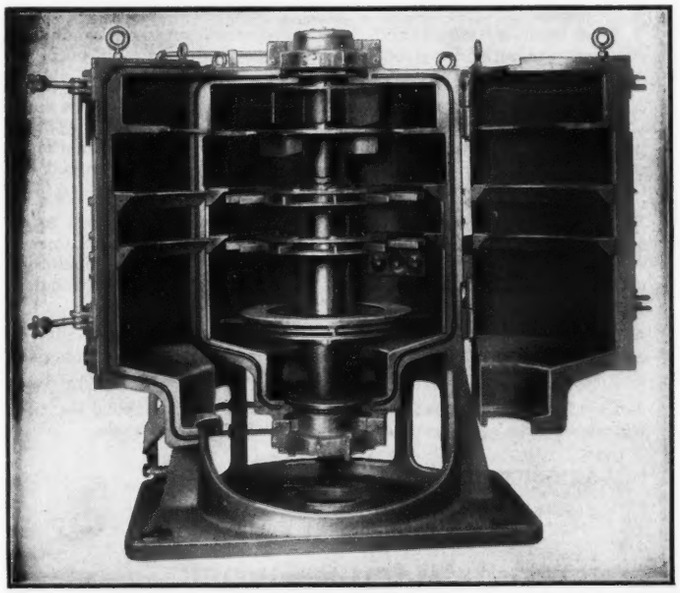
with the Raymond VERTICAL MILL



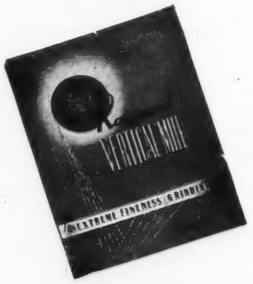
THIS modern design pulverizing unit offers a direct method of producing powdered materials in the low micron sizes by a single pass thru the machine with whizzer air separation to insure a uniform finished product.

It saves time in handling different jobs. When changing from one material to another, clean-outs and new set-ups can be made quickly. The operation is clean, dustless and automatic. Whizzer separation offers easy, instant fineness control over a wide range.

The mill gives excellent results on chemicals, clays, talc, earth colors, cobalt oxide, vermiculite, and soft nonmetallics. In scores of installations, the Raymond Vertical Mill has proved its unusual economy in making finest grades of materials.



- Hinged doors open wide for complete accessibility
- Double revolving whizzers maintain uniform fineness
- Simplified design . . . no gimmicks, close clearances or complicated adjustments

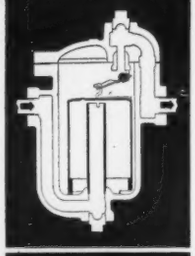


Details and applications in new Bulletin No. 78. Write for your copy.

COMBUSTION ENGINEERING, INC.
Raymond Division
1317 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS
SALES OFFICES IN PRINCIPAL CITIES
Combustion Engineering-Superheater Ltd., Montreal, Canada

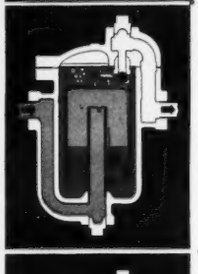
When inquiring check 2322 opposite last page

How Armstrong Trap Design Improves Plant Efficiency . . .

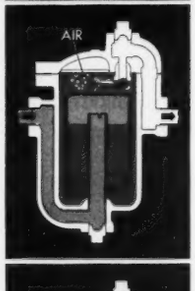


1 When trap is first installed, the inverted bucket is down and the valve is wide open. The large clearance between valve and seat minimizes restriction to condensate flow, contributing to large capacity.

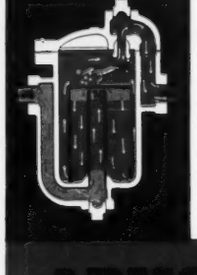
2 When steam is turned on, note how condensate (solid color) flows down between bucket and trap body, then up and out through orifice. Dirt is held in suspension and washed out when valve opens.



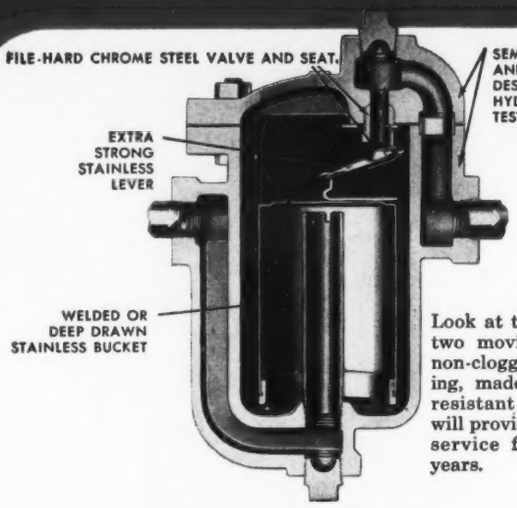
3 When steam reaching trap displaces less than ⅔ of the water in the bucket, it floats, closing the valve. Generous safety margin (dimension A) insures that steam will never reach trap orifice.



4 When more condensate enters trap, the bucket loses buoyancy and pulls on valve lever. (Note how incoming air passes through bucket vent and collects at top of trap, awaiting discharge.)



5 When weight of bucket times leverage overcomes pressure on valve, trap opens, creating momentary pressure drop that "pumps" condensate and non-condensibles from unit being drained.


FILE-HARD CHROME STEEL VALVE AND SEAT.
SEMI-STEEL BODY AND CAP. 250 LBS. DESIGN PRESSURE—HYDROSTATIC TESTED AT 500 LBS.
EXTRA STRONG STAINLESS LEVER
WELDED OR DEEP DRAWN STAINLESS BUCKET

Look at this trap. Only two moving parts. It's non-clogging, non-sticking, made of corrosion resistant materials. It will provide trouble-free service for years and years.

Time-Tested Inverted Bucket Principle Provides Five Cost-Reducing Benefits:

The modern Armstrong Trap is unsurpassed in these five major contributions to plant operating efficiency:

1. Fast heat-up—thanks to large condensate and air handling capacity. On batch or cycled production, you get maximum output per day.

2. High heat transfer rate—quick opening creates a sudden surge of condensate and air from the unit being drained. This pumping action prevents stratification of incondensibles and insures complete drainage. Laboratory and field tests prove it produces higher heat transfer than is otherwise possible.

3. Low Fuel Consumption—non-productive radiation losses are minimized because condensate is discharged at steam temperature as fast as it accumulates in the trap—you get more production per hour and per unit of fuel. And, there is no steam loss through the trap orifice.

4. Continuity of operation—the trap always opens for condensate; the simple, sturdy, self-cleaning mechanism insures continuous operation between inspections without interruption of processing.

5. Low Maintenance—no trap has ever gained so enviable a record for trouble-free service—ask anyone who has kept records.

Free: Steam Trap Book—
44 helpful pages on trap selection, installation maintenance, physical data and prices. Call your local Armstrong Representative or Distributor, or write:

ARMSTRONG MACHINE WORKS
8802 Maple Street • Three Rivers, Michigan

ARMSTRONG Inverted Bucket STEAM TRAPS

When inquiring check 2323 opposite last page

Drying Chlorine

(*Continued from preceding page*)

in bled off from the plant's chlorine pump seal circuit and is fed into top of drying tower. The amount of acid used is actually only a little more than was previously lost (prior to installation of scrubber and dryer) by gland leakage or by bleeding to remove residual water and dust picked up in the compressor seal circuit.

Results: Scrubber and dryer produce clean and dry chlorine gas. Unit uses approximately six gal (US) of 98% sulfuric acid per hour. Diluted acid (60%) is discharged from bottom of tower and is collected in acid eggs. Pressure drop through dryer is about 10″ water. Total space occupied by both the dryer and scrubber is only 7x17x24′ high.

(Scrubber and dryer trays were designed and supplied by Peabody Engineering Corporation, Dept. CP, 232 Madison Avenue, New York 16, New York . . . or for more information check 2324 on form opposite last page.)

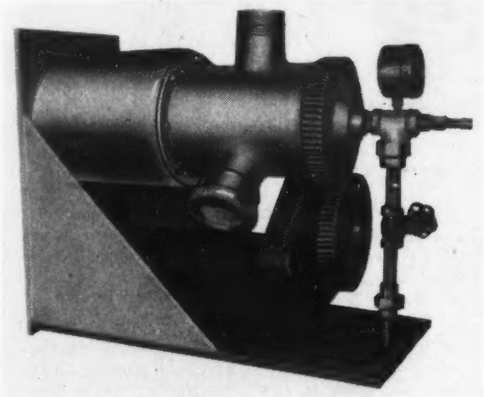
(Stoneware tower sections were made by General Ceramics and Steatite Corporation, Dept. CP, 23 Crows Mill Road, Keasbey, New Jersey . . . or for more information check 2325 on form opposite last page.)

"Where have we failed him?"

Applies controlled amounts of heat to finely divided materials . . .

unit can be used with conventional agitating or rotating furnaces or independently

Uses: Applying controlled quantities of heat to finely divided materials such as iron oxides, molybdenum disulfides, and other ferrous and non-ferrous products.



Heat addition to finely divided materials is controllable within wide temperature ranges and can be accomplished in oxidizing or reducing atmospheres

Features: Apparatus can be used with conventional rotating or agitating furnaces and can also function independently as efficient feeding and heating unit.

Description: Material to be heated enters unit through vertical inlet tube. The finely divided product is then surrounded by and mixed with the hot combustion gases or flame and is carried by this propelling force into a suitable receiving chamber. Heating is efficient, uniform, and rapid.

Heat treatment is controlled within wide temperature ranges, and treatments can be accomplished in either oxidizing or reducing atmospheres. Variable speed for feeding materials to be heated, plus wide range of possible variables of pressure and volumes of fuel and air provide flexibility of apparatus. Machine is available in various sizes.

(Feeding and heating device is produced by Steel Processing Company, Dept. CP, 212 Wood Street, Pittsburgh 22, Pa. . . . or for more information check 2326 on form opposite last page.)

This month's Processing and Engineering Data section starts on page 208

This advanced-type equipment is making

MORE PROFITS FOR PROCESSING INDUSTRIES

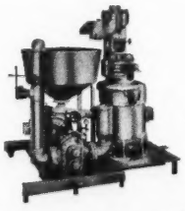
The principles of attrition-grinding and impeller-dispersing as embodied in the new models of Morehouse Mills and Cowles Dissolvers are producing spectacular results in over 70 industries throughout the world. They can do the same for you. LET US PROVE IT IN YOUR PLANT—AT OUR RISK!

TYPICAL MOREHOUSE MILLS
Many models to choose from —capacities from 1 to 2000 gals. pr. hr.

MODEL B-2000. Height, 66⅝"; width, 31⅝".

MODEL M. Height, 38⅝"; diameter, 14".

MODEL SS-30. Height, 50"; diameter, 20".



MODEL B-2005 Grease Mill and Deaerator. Height, 72"; width, 28".

If you process products like these—

ADHESIVES	FILTER CAKE
FUNGICIDE	COATINGS
PAINTS	ENAMELS
SODIUM DISPERSIONS	SOLIDS CONCENTRATIONS
STARCH COOKING	GAS DISPERSIONS
PLASTISOLS & ORGANISOLS	PLASTER DISPERSIONS
POLYESTER RESINS	INKS

. . . there is a Morehouse or Cowles unit to meet your needs—in stainless steel where required.

Morehouse attrition-grinding mills reduce particle size by processing the material between a stator and a rotor that operates at ultra-high speed —up to 5400 R.P.M. As a result amazing volume is produced in a fraction of the space required by ordinary equipment. Micro-adjustment assures accurate control and duplication of desired particle size with consequent improvement in appearance, texture and overall quality. Operation is smooth, practically vibrationless, and trouble-free

Cowles impeller-dispersing dissolvers easily handle viscosities in excess of 50,000 centipoises. Patented impellers rotate at peripheral speeds of 2000 to more than 5000 F.P.M., producing great shear, impact and turbulence. Volume is increased many-fold over old style mixers. Ultimate dispersion is achieved in a fraction of the time. Quality improvement is immediately apparent.

A trial will convince you that you too can
Make more profits with Morehouse and Cowles.

Arrange for such a demonstration in your plant, *at our risk.* Write today for complete details.

MOREHOUSE-COWLES, INC., 1150 San Fernando Rd., Los Angeles 65, Calif. Distributors in Principal Cities (Cable Address "MORESPEED," Los Angeles).

Quality Production Champions of the Processing Industries
Convenient lease and time-payment plans.

MOREHOUSE COWLES

TYPICAL COWLES DISSOLVERS
Many models to choose from

10 AND 20V with hydraulic lift. For big-volume production. 80" high, 10-40 HP.

10 AND 20D, for installation on your own tanks. For adaptation up to 40 HP.

7-VTV. Mobile Tip-Up Type. For 5 to 80 gallon batches. Max. tilt will accommodate 46" tank.

1-VG Laboratory Lift-Up Type. For testing, pilot plants and small batches. Results identical to production-size models. Max. rise, 10".

When inquiring check 2327 opposite last page

a series about
PROCTOR SERVICES
for your new products

Mr. Albert G. Blank
Sales Manager
Process Industries Sales

planning product drying with your research team

This is one of a series of articles to acquaint you with Proctor's various services available to you in your consideration of processing equipment for your products, existing or new.

Your research team is instrumental in promoting improvements in your products or evolving new ones, and in this work, it is ever aware of the need for tailoring the product to commercial processing equipment or searching for processing equipment to suit the peculiar needs and requirements of the product itself.

Therefore, your research team will want to know how Proctor can serve its interests at the inception of a problem.

Let's take continuous drying of a product in a processing range as an example.

Proctor can, from their specialized knowledge gained over many years of experience in the continuous drying of materials, serve as a guide in correlating the selection of drying equipment, with the supplementary dewatering equipment and dry end processing equipment.

Ordinary sources or information on commercial dryers cannot begin to cover the myriad problems that arise, due mainly to material characteristics, in the selection of proper continuous drying equipment.

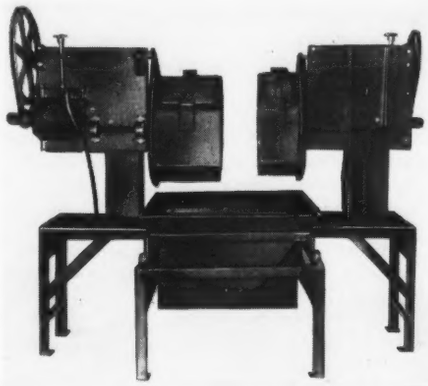
You therefore can materially benefit from your association with Proctor by calling us in early on a new problem to avail yourself of the years of experience and the analytical ability of our organization.

It is a matter of record that this procedure has many times benefited those who have elected to use our service and we herewith offer it to you.

We invite your research team to communicate with Proctor as soon as they are involved in a problem involving continuous drying operation.

Proctor
PROCTOR & SCHWARTZ, INC.
PHILADELPHIA 20, PA.

When inquiring check 2328 opposite last page



Supports tumbling unit

Stand designed to bolt onto frame of screen separator supports tumbling unit in position to unload into separator. Stand can be used in either left- or right-hand position, or two stands can be set up to unload into the same separator. All-steel construction of stands allows for heavy use.

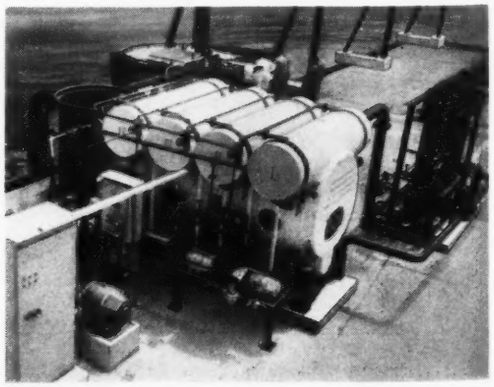
("Piggy Back Stand" is product of Rampe Manufacturing Co., Dept. CP, 14915 Woodworth Ave., Cleveland 10, Ohio . . . or for more information check 2329 on form opposite last page.)

Economic distillation of sea water with flash distilling unit . . .

scale-free, fully automatic operation is assured

Uses: Unit is designed to produce distilled water of very high purity from normal sea water. Evaporator can also be adapted for decontamination of wastes and recovery of valuable components from effluent streams in pulp and paper, chemical, and other industries.

Features: Four-stage unit produces over 1000



Sea-water distiller has capacity of 1000 gallons per hour of very high purity water

gallons per hour of distillate with less than 1/4 grain per gallon total solids. Design permits scale-free completely automatic operation.

Description: Evaporator overcomes tendency to entrain sea water which results in product contamination. It can utilize low-level heat such as waste heat from diesel engines or atomic reactors, or inexpensive high-level heat, such as oil-field flare gas, when available. Compact in size and with wide range of capacities, units can be used on surface ships, submarines, offshore drilling rigs, industrial plants, or in small communities.

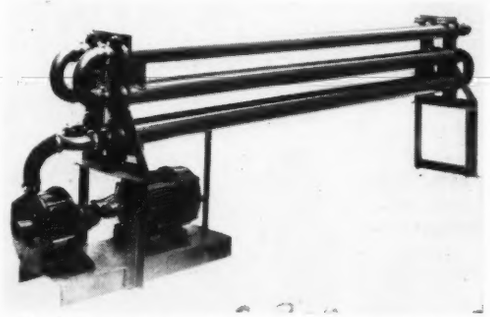
Corrosion and contamination are minimized through use of corrosion-resistant components. Small, mobile evaporator units using two and three stages, or larger units taking advantage of as many stages as practicable, are available.

(Sea water flash distillers are product of Badger Manufacturing Company, Dept. CP, 230 Bent St., Cambridge 44, Mass. . . . or for more information check 2330 on form opposite last page.)

Metal finishing solutions heated or cooled by dual unit

Uses: To heat or cool large quantities of plating, anodizing and pickling solutions.

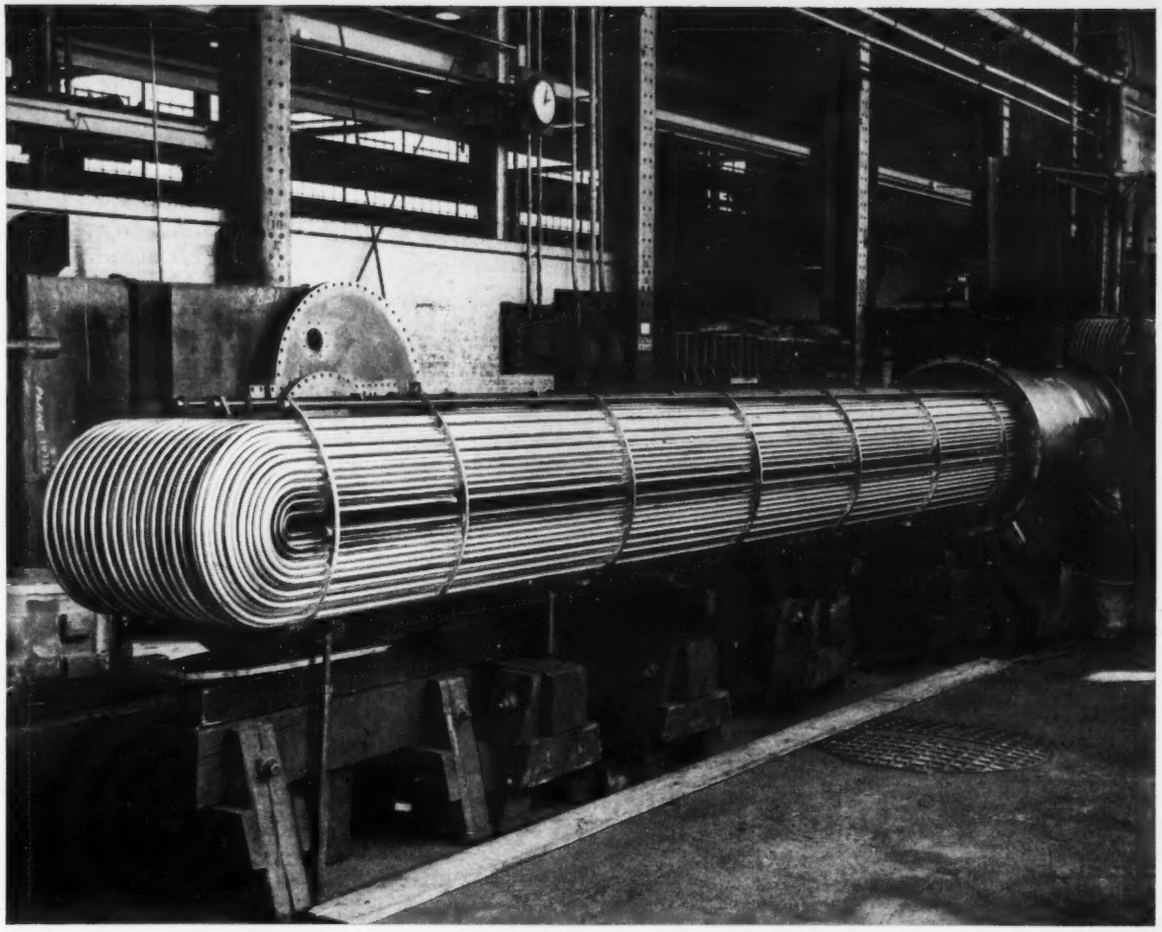
Features: Jacketed exchanger and proper capacity pump are mounted on single base to perform any heating or cooling job for metal finishing.



Dual unit can be provided with built-in temperature controls for either heating or cooling

Description: Exchangers use Karbate, steel, stainless, titanium, or tantalum, depending on corrosion characteristics of various solutions. Pumps are made of acid-proof plastic, cast or stainless steel to match corrosion resistance of exchangers. Units are available in capacities up to 3,200,000 Btu/hr. Built-in temperature controls for either heating or cooling can be provided.

(Camac Big Job units are product of Carl Buck & Associates, Dept. CP, Essex Fells, N.J. . . . or check 2331 opposite last page.)



U-Bend Tubes of Anaconda Arsenical Admiralty-439 assembled in a bundle for a horizontal feed-water heat exchanger by The Griscom-Russell Co., Massillon, Ohio.

Arsenical Admiralty U-Bend Tubes make a compact power station feed-water heater

THIS compact tube bundle contains 436 Anaconda Arsenical Admiralty-439 tubes, 5/8-inch OD x .049-inch gage, averaging 45 feet long. The bundle is now operating in a power station feed-water heater.

The American Brass Company is constantly studying corrosion problems affecting condensers and heat exchangers—and is a leader in the development of alloys to help meet these problems. Arsenical Admiralty-439 is but one of its many contributions in the field.

Full Range Available. Anaconda heat exchanger and condenser tubes are made for all sizes and kinds of shell-and-tube, submerged, spray-tower, and finned-atmospheric heat transfer equipment – for operation at elevated temperatures in conformance with ASME standards for allowable stresses.

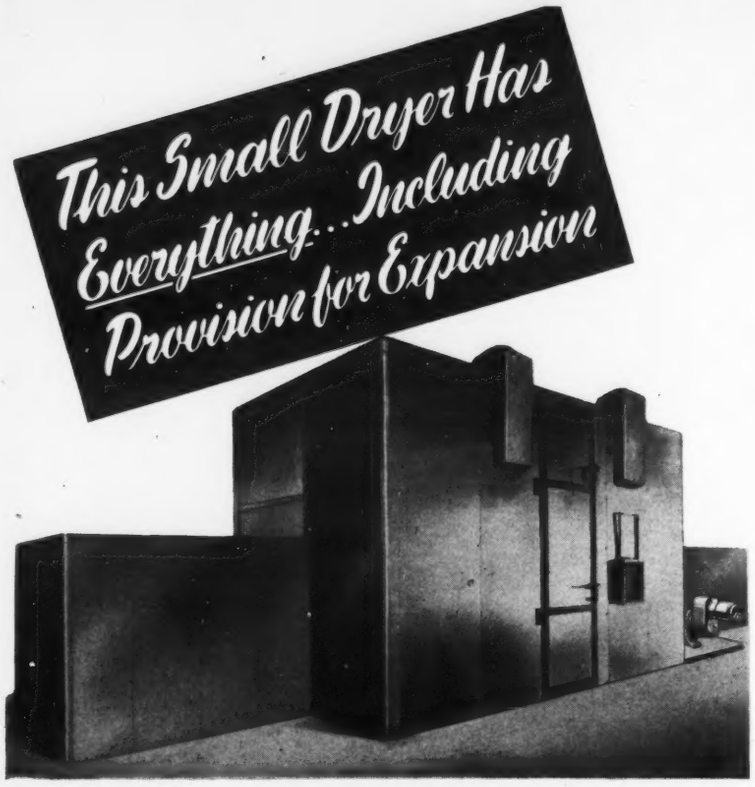
Technical Assistance. The Technical Department of The American Brass Company is regularly helping manufacturers, power companies, marine operators, petroleum and chemical companies to select the correct tube alloy for many types of condensers and heat exchangers. This service is available to you without obligation. Write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

5783

ANACONDA®

Tubes and Plates for Condensers and Heat Exchangers

When inquiring check 2332 opposite last page



"NATIONAL" APRON CONVEYOR DRYER

While this comparatively small Apron Conveyor Dryer was installed to immediately provide pilot plant production, it is readily adaptable to expansion to meet future large-scale production requirements. It incorporates all the features available in the largest "National" Dryers of this type, including the following:

The most efficient air control devices, to assure absolute uniformity of air distribution and condition through the material.

Wide flexibility in air delivery by use of adjustable pitch fans.

Adjustable sealing of air to eliminate leakage and dust carry-over to chain and other parts of equipment.

Newest heavy-duty trussed-type apron hinges.

Latest devices for chain alignment control and lubrication.

Send for Folder Describing "National" Single and Multiple Apron Conveyor Dryers and Related Equipment

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

England Agent: JONES & HUNT, INC., Gloucester, Mass.
Cable Address: "NADRYMA"—W. U. Code

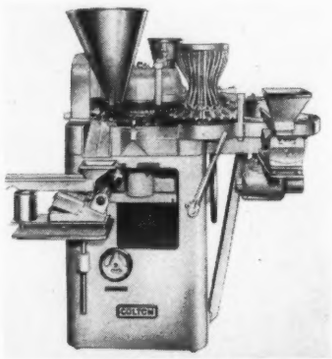
When inquiring check 2333 opposite last page

Up to 900 tablets per minute coated by machine

Uses: Applying uniform, dry coatings to tablet cores.

Features: Machine can coat up to 900 tablets per minute.

Description: Coater occupies only 4x4-ft floor space. Unit is powered by a 2-hp motor. Machine will apply coatings to round-face or shallow convex-face compressed cores of either friable or hard-tablet types. Maximum diameter of finish-coated tablets is 5/8 inch. Total standard depth of fill is 1/2 inch. Maximum compressive force exerted by machine is 5000 lb.



High-speed coater will handle either friable or hard tablets

(Model 232 compression coating machine is development of Arthur Colton Co., Division of Snyder Tool and Engineering Co., Dept. CP, 3400 East Lafayette, Detroit 7, Mich. Check 2334 opposite last page.)

Covers equipment design for process industries

Fabrication and design of agitation, heat transfer, and distillation equipment are discussed and illustrated in eight-page catalog. Plant facilities and available engineering services are also described.

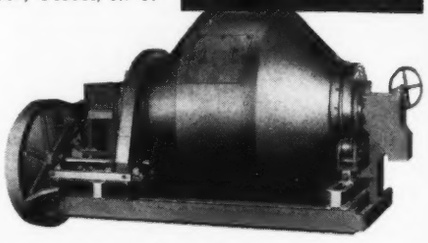
Cat C-57 is issued by Colonial Iron Works Co., Dept. CP, 17631 St. Clair Ave., Cleveland 10, O. Check 2335 opp. last pg.

7-WAY ACTION ...for better, faster blending

It lifts ... blends ... mixes ... seven ways, assuring faster, more accurate blending of dry ingredients. Empties completely. Will not grind or reduce particles. Ideal for blending of fertilizers, insecticides, fibrous materials, pharmaceuticals, atomic materials, chemicals, and a wide variety of other ingredients. Can be fitted with internal liquid spray pipe. Gravity intake and discharge with no internal bearings for free-flowing materials.

For details write to:
MUNSON MILL MACHINERY CO.
Dept. P-357, UTICA, N. Y.

MUNSON
ROTARY BATCH MIXER



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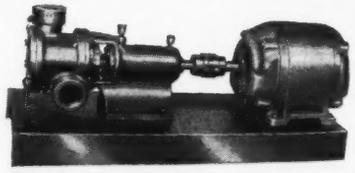
by PROGRESS out of NECESSITY

The NEW!
AURORA® APCO
Z4 *Process* PUMPS



for HANDLING LIQUEFIED PETROLEUM GASES, REFRIGERANTS and other NON VISCOUS LIQUIDS of MODERN INDUSTRY

Modern industry offers a challenge in the form of new and difficult applications which demand improved pumping techniques. In the Type Z4 APCO Turbine-Type Pumps will be found the complete answer to many of the applications involving liquefied gases and other light, non-viscous liquids. Obtainable in special metals with notable economy.

AURORA Always PUMPS

Write for BULLETIN 111-ZA

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
62 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT, AURORA, ILLINOIS, CABLE "NYABINT"

When inquiring check 2337 opposite last page

Dew points better than —100°F obtained with gas purifier

Uses "molecular sieves" to remove water formed in catalytic reaction

Uses: Purifying and drying hydrogen.

Features: Unit uses a Linde "molecular sieve" as desiccant in place of activated alumina used on manufacturer's previous models. Dew points of better than −100°F are reported to be obtained. Catalyst used in purification phase is of the permanent type which, under normal use, never requires reactivation.

Description: Unit performs catalytic combination of oxygen and hydrogen at room temperature. Reaction is so complete that there is less than one ppm of either the oxygen or hydrogen impurity remaining. The combination is in the ratio of two parts hydrogen to 1 part oxygen. Product of reaction is water vapor, which is removed by the desiccant.

Compact design

Of compact, cabinet-style design, unit may be installed at any convenient point on low pressure side of gas line. Capacity depends upon moisture content and impurity of incoming gas. In a typical application, equipment feeds dry oxygen-free hydrogen into an atmospheric furnace at rate of 100 cfh. Pressure drop through purifier is 2.5 psi. Other gases such as nitrogen, argon, neon, and saturated hydrocarbons can also be handled, provided that ratio of two volumes of hydrogen to one of oxygen is always present for the catalytic reaction.

The molecular sieves used in the equipment are crystalline alumino-silicates. They have up to 19 times more water adsorption capacity than conventional silica-type adsorbents. The desiccant releases the water when activated by heat, with little or no change occurring in the material's crystal structure. Reactivation in the Puridryer is accomplished by means of a 200-watt, 110-115 volt AC, 60-cycle heater.

(Deoxo Puridryer MS is product of Instruments Division, Baker & Company, Inc., Dept. CP, 207 Grant Avenue, East Newark 2, N.J. . . . or for more information check 2338 on the convenient Reader Service slip which is located opposite last page.)

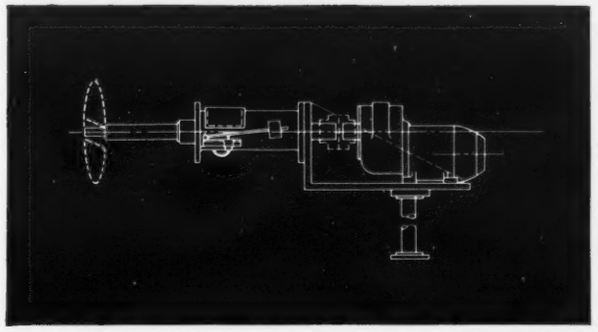
(Additional information on molecular sieves may be obtained from Linde Air Products Company, A Division of Union Carbide and Carbon Corporation, Dept. CP, 30 East 42nd Street, New York 17, N.Y. . . . or by checking 2339 on the convenient Reader Service slip which is located opposite last page.)

TURBO-MIXER GENERAL AMERICAN

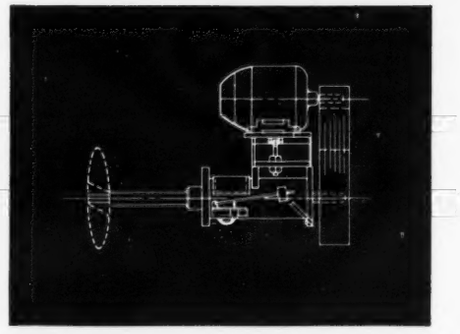
TURBO-TOPICS

announcing the new Turbo-Mixer side-entering propeller series

Expertly designed, based on 44 years of specialized experience. The simple, sturdy design of this new series of Turbo-Mixers makes servicing easier, reduces maintenance costs. Models are available in standard sizes from 1 H.P. to 30 H.P.



DIRECT DRIVEN



V-BELT DRIVEN

TURBO-MIXER DIVISION
GENERAL AMERICAN TRANSPORTATION CORPORATION

Sales Offices: 380 Madison Avenue, New York 17, New York • General Offices: 135 South La Salle Street, Chicago 90, Illinois • Offices in all principal cities

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin(s):

_____ Side Entering Propeller Mixer Bulletin
_____ RDC Extraction Column Bulletin
_____ Minerals Processing Bulletin
_____ General Turbo-Mixer Bulletin

Please indicate bulletins you want. Send list with your name, title, company name and address to:

Turbo-Mixer
380 Madison Avenue
New York 17, New York

When inquiring check 2340 opposite last page

FILTRATION *Engineered* TO MEET INDUSTRY'S NEEDS

CUNO

The ONLY Line that offers You Several Distinct Types of filter Media . . . The RIGHT Choice for Every Requirement

AUTO-KLEAN

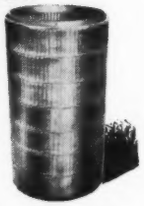
METAL EDGE TYPE

Continuously cleanable. Combine small size, high flow rates and low pressure drop. A wide range of models and sizes with capacities to 4000 gpm and filtrations as fine as 40 microns.

FLO-KLEAN

WIRE-WOUND

For low-viscosity, high volume (up to 15,000 gpm) filtration. Filtration from .0025" to .030". Filters are completely automatic, continuously self-cleaning without loss of backwash fluid.



MICRO-KLEAN

FIBER CARTRIDGE

New white cellulose cartridge for 5-micron filtration wherever clarity, purity and taste are essential. Wool cartridge for a wide range of 10 to 70 micron applications including compressed air. Housings for flow rates from a few gph to hundreds per minute.

PORO-KLEAN

POROUS STAINLESS STEEL

Cartridges and special forms. Combine extreme heat and corrosion resistance, high tensile strength and very fine filtration (down to 5 microns, standard). Tests prove no contamination from particle discharge.

*Because no *one* type of filter is best for every need, Cuno – and *only* Cuno – offers you a truly complete line that includes *several* distinct types of filtration media. And because every filtration system must be specified and engineered to the individual job requirements, Cuno also offers you a complete application engineering service through the Cuno Systems Engineer. Conveniently located in your area, one of these specialists is ready and qualified to help select the filter type and model exactly right to solve your problems.

SEND FOR FREE PRODUCT LITERATURE

CUNO ENGINEERING CORPORATION

503 SOUTH VINE STREET, MERIDEN, CONNECTICUT
TELEPHONE: BEverly 7-5541

EDGE-TYPE, WIRE-WOUND, FIBER CARTRIDGE and POROUS METAL FILTERS

Filtration Engineers *in Principal Cities*

When inquiring check 2341 opposite last page

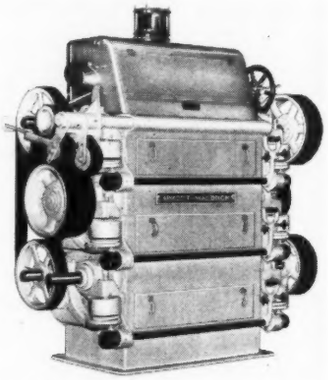
One-point control system featured on mill . . .

single lever easily controls, adjusts, rolls

Uses: Crushing, grinding, granulating, and pulverizing various materials.

Features: Rolls are easily controlled and adjusted by means of one-point, spring-loaded control system.

Description: Mills are made with 9 and 10" diameter rolls and may be of one-, two-, or three-pair high types. All parts coming in contact with material being processed are made of stainless steel or other corrosion-resistant materials.



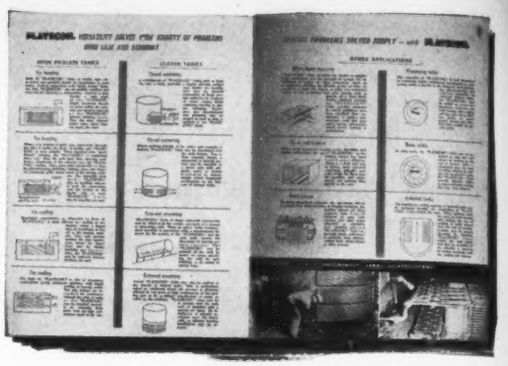
Rolls on mill are continuously cleaned by full length brushes

One-point spring-loaded roll control system consists of a hand lever located at one end on front of the mill. Lever activates eccentric-mounted shaft extending full length of mill and provides instant, individual throw-out of each pair of rolls.

Should tramp metal enter between rolls, heavy springs compress and permit rolls to separate, allowing for quick passing of the metal, after which rolls spring back to original grinding position. Rolls are continuously cleaned by full-length brushes available in nylon, Tampico, or stainless steel.

Feeder housings are constructed of aluminum and stainless steel

(*Please turn to page* 155)



New Heat Transfer Sketch Book shows how to CUT COSTS all over the plant

Platecoil heat transfer units can be used in many ways, in many tanks, in many plants in many industries. The sketches shown above indicate some of the ways in which Platecoil has been used and can be used. They are featured in a new Platecoil bulletin that also contains many pictures, drawings and information on Platecoil installations and features. Send today for your free copy. Ask for Bulletin P-54.

Fast delivery from stock

PLATECOIL
Division
Tranter Mfg. Inc.
LANSING 4, MICHIGAN

You'll Find our Catalog in Sweet's Plant Engineering File.

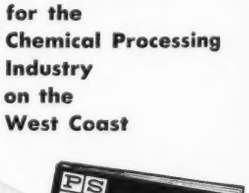
When inquiring check 2342 opposite last page

WHEN SPECS CALL FOR...

ACID PLANT VESSELS

for the Chemical Processing Industry on the West Coast

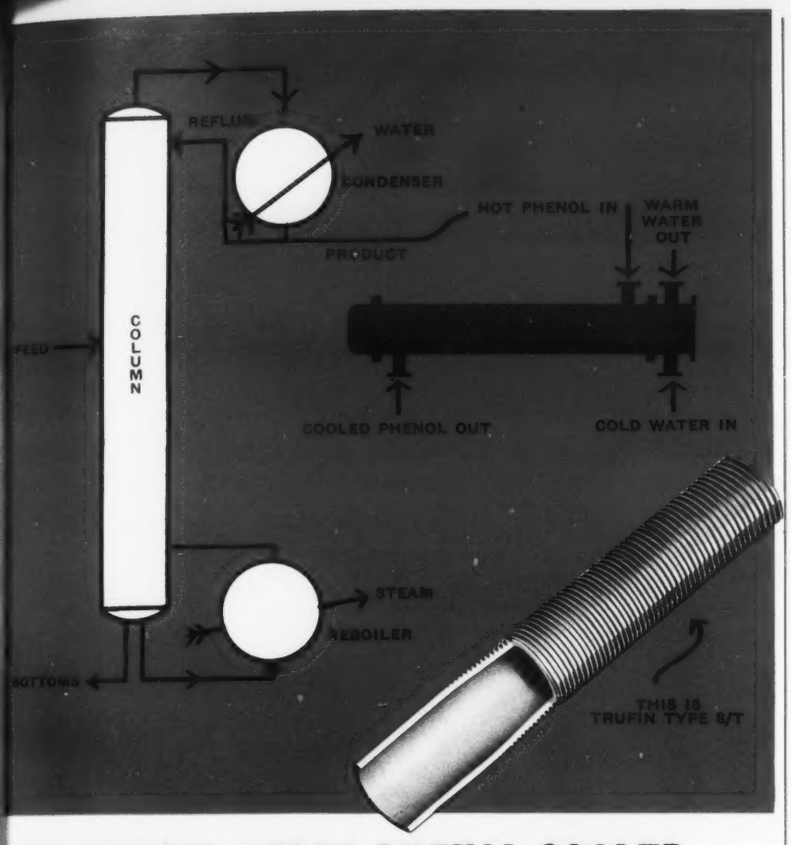
Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.



Request Brochure No. M-57

PS F SINCE 1900 PUGET SOUND FABRICATORS, INC.
Craftsmen in Metals
3670 E. Marginal Way • Seattle 4, Wash.
Craftsmen in steel plate and alloys up to 1"

When inquiring check 2343 opposite last page



ONE TRUFIN-TUBED PHENOL COOLER REPLACES TWO PLAIN TUBE EXCHANGERS

By Ernest Dodd

Down near Louisiana's gulf coast, processing engineers at a large refinery are currently engaged in some highly interesting experiments in the field of heat transfer.

To put it bluntly, the objective of their research is to compare the performance of Wolverine Trufin® Type S/T against that of prime surface condenser tube. The results to date are proving conclusively that Trufin Type S/T offers plus advantages impossible to obtain from plain tube.

In conducting their research, the engineers are using two coolers—one tubed with prime surface tube and the other with Wolverine Trufin Type S/T—the integrally finned condenser tube. The operation involved is the cooling of phenol with water on the tube side and the phenol being cooled on the shell side.

To obtain a comparison of performance everything is the same—except the surface of the tubes. The extended surface, Trufin-tubed unit has 860 pieces of Admiralty Trufin Type S/T ¾" O.D. by 16' in length. The prime surface unit also has 860 pieces of tube of the same O.D., alloy and length.

It is in heat transfer surface, however, that a startling difference becomes apparent. The prime surface unit has a total of 2,690 square feet. In the Trufin-tubed unit the total heat transfer surface soars to 6,050 square feet—an increase of 125% (or 225% of the surface of the plain tube unit).

The Trufin-tubed cooler has been on stream for the past eight months and is presently handling the entire heat load formerly handled by the two plain tube coolers. Its record, in fact, is so good that the refinery engineers have designed Trufin into several of their forthcoming expansions.

WRITE FOR FREE BOOK

Actual installations where Wolverine Trufin is being used throughout the processing industries are described in text and drawings in the "Wolverine Trufin Process Flowsheets" Book.

In addition, this handy book also contains information about Wolverine Tube, its facilities and the specialized engineering services it offers its customers.

Processing Engineers—both experienced veterans and those just starting their careers will want to add this source of finned tube information to their reference files.

The Trufin Process Flowsheets Book is yours without cost or obligation. Write for your copy today!

CAN SUBSTITUTE TRUFIN DIRECTLY FOR PLAIN TUBE

When retubing heat exchangers or condensers, no basic equipment changes are necessary where Wolverine Trufin takes the place of prime surface tube.

During the finning process the ends of the tube are left without fins and the tube is designed so that the O.D. of the plain end is slightly larger than the O.D. over the fins. As a result, Trufin can be inserted into the bundle and rolled directly into the tube sheet in the regular manner using standard tools and normal retubing techniques.

TRUFIN INCREASES ON STREAM TIME

When working for the first time with integrally finned condenser tube, designers sometimes assume that finned tubing should be used only in a clean service.

Nothing could be farther from the truth. The compilation of actual operating data and the results of extensive pilot plant research are proving, instead, that integrally finned Wolverine Trufin actually gives better service than plain tube over longer periods of time.

Comparison tests (such as that described at the left) show that when Trufin fouls, the buildup of scale follows the profile of the fins and tube instead of preferring the valleys between the fins. Because Trufin does not present a flat, unbroken surface, there is a strong tendency for the scale to fall away—thus preventing the buildup of an impervious layer.

Wolverine Trufin available in Canada through the Unifin Tube Company, London, Ontario.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA OF CANADA LIMITED
CANADA VULCANIZER AND EQUIPMENT COMPANY LIMITED

WOLVERINE TUBE

Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

Plants in Detroit, Michigan, and Decatur, Alabama. Sales Offices in Principal Cities
EXPORT DEPT., 13 E. 40TH ST., NEW YORK 16, N.Y.

MODERN HEAT TRANSFER CALLS FOR

Take a good look at the heat transfer operations listed at the right. Each is another in the long list of applications where Wolverine Trufin—the integrally finned condenser tube—is boosting heat exchanger and condenser capacity by transferring more BTU's per foot of tube.

In recent months, this series of advertisements has described operations where Trufin has boosted capacity by as much as 70%. These are authenticated figures—proof indeed that Wolverine Trufin is the answer to modern heat transfer needs.

If you're looking for increased capacity, reduced heat transfer costs and better all-round performance, now is the time to investigate Wolverine Trufin. Send for your copy of Wolverine's new book "Comparative Heat Exchanger Costs" or let Wolverine's Field Engineering Service review your particular problem. Either way you'll be on the road to increased heat transfer efficiency.

- Asphalt heater
- Reboiler
- Atmospheric section
- Light hydrocarbon condenser
- After cooler
- Heater
- Nitrogen after cooler
- Propane condenser
- Debutanizer condenser
- Ammonia condenser
- Methyl chloride condenser
- Phenol cooler
- Ethyl chloride condenser
- Butylene condenser
- Freon condenser
- Toluene reboiler
- Iso butane condenser
- Cooler
- Oil to Oil
- Debutanizer reboiler
- Oil cooler
- Gas cooler
- Inter-cooler
- Kerosene cooler
- Oil heater
- Tank suction heater
- Stripper overhead condenser
- Amine reboiler
- Debutanizer bottoms cooler
- Alcohol cooler
- Lube oil cooler
- Lean oil—rich oil exchanger

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Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES

EXPORT DEPARTMENT, 13 EAST 40TH STREET, NEW YORK 16, NEW YORK

(*Continued from page* 154)

and are made so all interior parts can be easily reached from both front and rear. Feeder can be removed in one piece without disturbing spouting.

(One-Point Control roller mills are product of Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. . . . or for more information check 2344 opposite last page.)

Hydraulic filter press closer installed in minutes

Hydraulic device for closing plate-and-frame filter presses is described in four-page bulletin. Unit comes complete and can be installed in matter of minutes. Photographs and drawings show operation and list specifications of units.

"The Hydro-Lock" is issued by Biach Industries, Inc., Dept. CP, 10 Indian Spring Road, Cranford, N.J. When inquiring specify 2345 on form opposite last page.

Lists specifications of pulverizers

Pulverizers designed for large- and small-scale production are shown in two-page bulletin. Materials that can be pulverized, and list of over 25 industries that use the equipment are included.

Bul 242 is issued by Gruendler Crusher & Pulverizer Co., Dept. CP, 2951-19 N. Market St., St. Louis, Mo. When inquiring specify 2346 on form opposite last page.

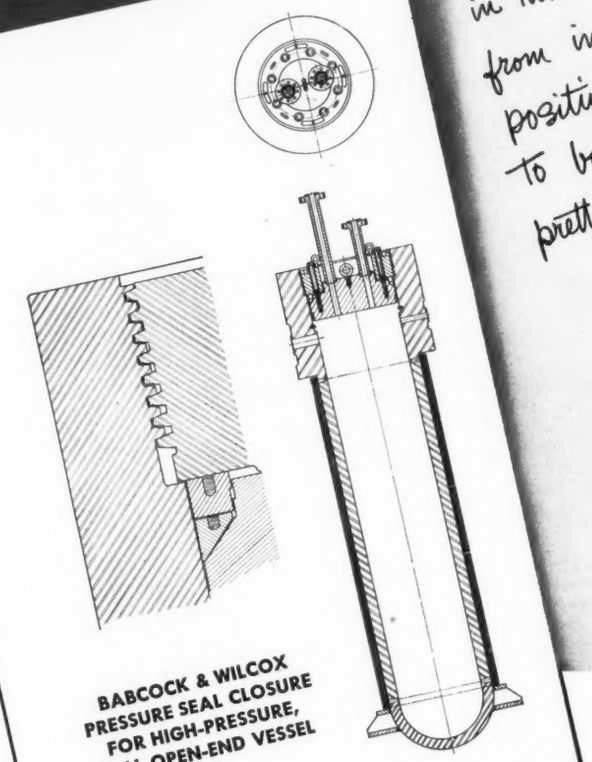
For more information on product at left, specify 2347 . . . see information request blank opposite last page.

For more information on product at right, specify 2348 . . . see information request blank opposite last page.

AG—

Here's why I think B+W deserves careful consideration when we specify full-open-end construction for high pressures—in this method of closure, pressures act from inside to seal the vessel. It's a positive method of closure as opposed to bolting from outside. This looks pretty good to me.

RMD



BABCOCK & WILCOX PRESSURE SEAL CLOSURE FOR HIGH-PRESSURE, FULL OPEN-END VESSEL

Only B&W Pressure Vessels offer—

- Complete x-raying of critical welds
- Full longitudinal stress-relieving
- Banded construction (where desirable)
- Full open end construction (where specified)
- Hollow forging construction (where desirable)

Every manufacturing step is a specialty operation developed out of long experience, and many B&W construction and testing methods are exclusive with B&W. Users of B&W Pressure Vessels get the maximum in sound construction and safe service.

It will pay you to get all the facts about B&W Pressure Vessels in relation to your requirements. The Babcock & Wilcox Company, Process Equipment Department CP-3, Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

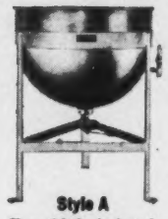
S-465-PB

LEE

Corrosion-Resistant

PROCESSING EQUIPMENT

PRECISION BUILT OF STAINLESS STEEL
TO YOUR SPECIFIC REQUIREMENTS

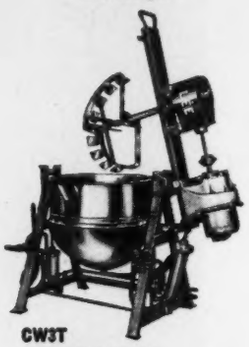


Style A
Two-thirds Jacketed
5 to 500 gal.

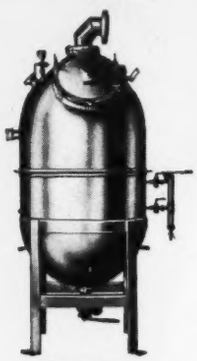
Style B
Full Jacketed
10 to 300 gal.

Style C
Two-thirds Jacketed
5 to 100 gal.

Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

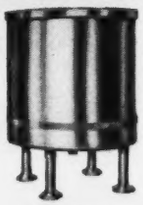


CW3T
Center-line Scraper
Agitator Kettle—80 to 300 gal.

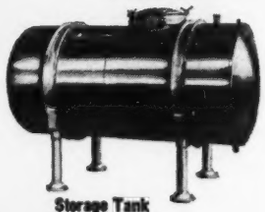


Vacuum Pan
50 to 500 gal.

Style CW
Two-thirds Jacketed
80 to 300 gal.



Pulp Tank
500 to 2,000 gal.



Storage Tank
100 to 5,000 gal.

Quick Cooling Pan
50 to 200 gal.

Technical bulletins fully describing these processing units gladly sent on request.

418 PINE STREET, PHILIPSBURG, PA.

Designers and Manufacturers of Corrosion-Resistant Processing Equipment for over 25 years.

When inquiring check 2349 opposite last page

Report tells how to estimate costs of graphite processing equipment

Information designed to help in cost estimation and selection of manufacturer's impervious graphite processing equipment is presented in 32-page report. Detailed cost data are furnished for heat exchangers, cascade coolers, HCl absorbers, towers, centrifugal pumps, rupture disks, pipe, fittings, and valves. Chart of chemical resistances with brief outline of properties and characteristics of manufacturer's impervious graphite is included.

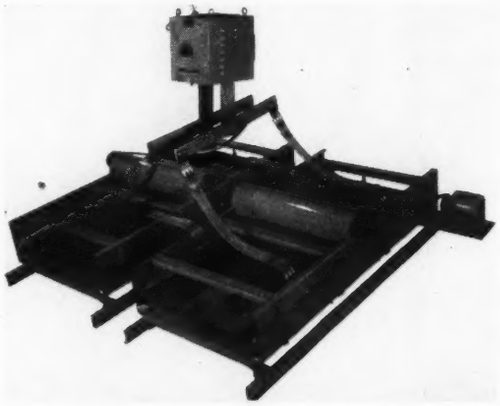
"Data for Cost Estimation" may be obtained on letterhead request to Falls Industries, Inc., Dept. CP, Aurora Road, Solon, Ohio.

Complicated insulation eliminated for vibrating-screen heating . . .

tensioning rails are made of insulated material, transformer is mounted above screen

Uses: Screening damp, sticky material to fine sizes without blinding screen mesh.

Features: Screen cloth is entirely insulated from steel frame of machine. Tensioning rails are formed of insulated material, with tensioning bolts buried in the rails. This eliminates need for

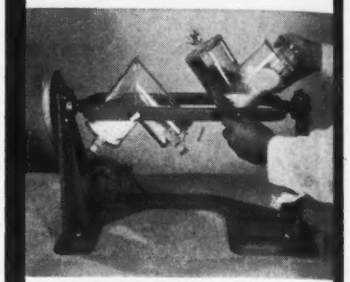


Positioning of transformer and feeder cables over screening surfaces cuts current losses and reduces possibility of shorts or grounds

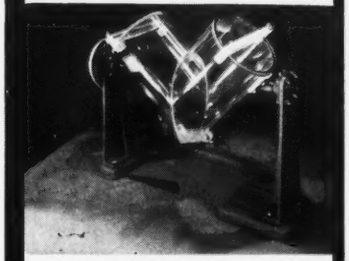
conventional insulating materials at sides of screen or fiber bushings to insulate the tension bolts. Transformer is suspended above screen. Special extruded rubber channel strips provide insulation down center of screen.

Description: Copper distribution bars are securely clamped to screen cloth, being bolted between steel angles and screen mesh (see drawing) along the entire length. Either plain steel or stainless steel wire cloth may be used. Secondary volt-

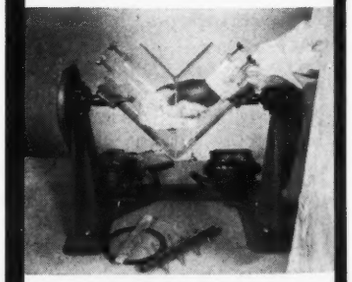
2 BLENDERS IN ONE!



P-K Yoke model blender is ideal for small scale batch blending. Yoke arrangement fits standard 4 or 8 quart blender frame . . . permits two different blends at once . . . accommodates two 1 pint or two 1 quart or one 2 quart shell . . . or a combination of quarts, pints. Shells of heavy transparent Lucite or stainless steel can be removed in a jiffy. Yoke models are available from stock.



Changeover to single 4 or 8-quart shells for standard blending jobs is simple. Charging or discharging is easy through large access openings in the transparent Lucite or stainless steel shells. All p-k lab models utilize a gearhead motor with a chain and sprocket drive. Standard 4 and 8 quart lab model and extra shells are stocked for immediate shipment.



This is a p-k Twin Shell Intensifier model designed to produce completely uniform lab blends of materials difficult to mix. Shells are water and dust-tight, and can be clinically cleaned. Stainless, self-centering intensifier bar (foreground) snaps into place, spins at high speed to break up lumps. Intensifier models are available from stock in 4 or 8 quart working capacities.

FREE

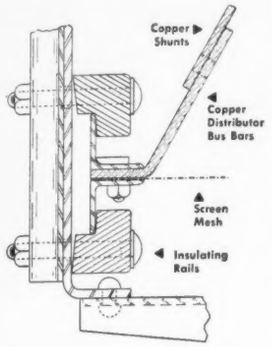
To get the full story ask for our new catalog 14

The Patterson-Kelley Co. Inc., 730 Hanson Street, East Stroudsburg, Pa.

PATTERSON-KELLEY
Chemical and Process Division

When inquiring check 2350 opposite last page

age ranges from 1½ to 5½ volts, depending upon rheostat setting, so that all parts may be handled with safety.



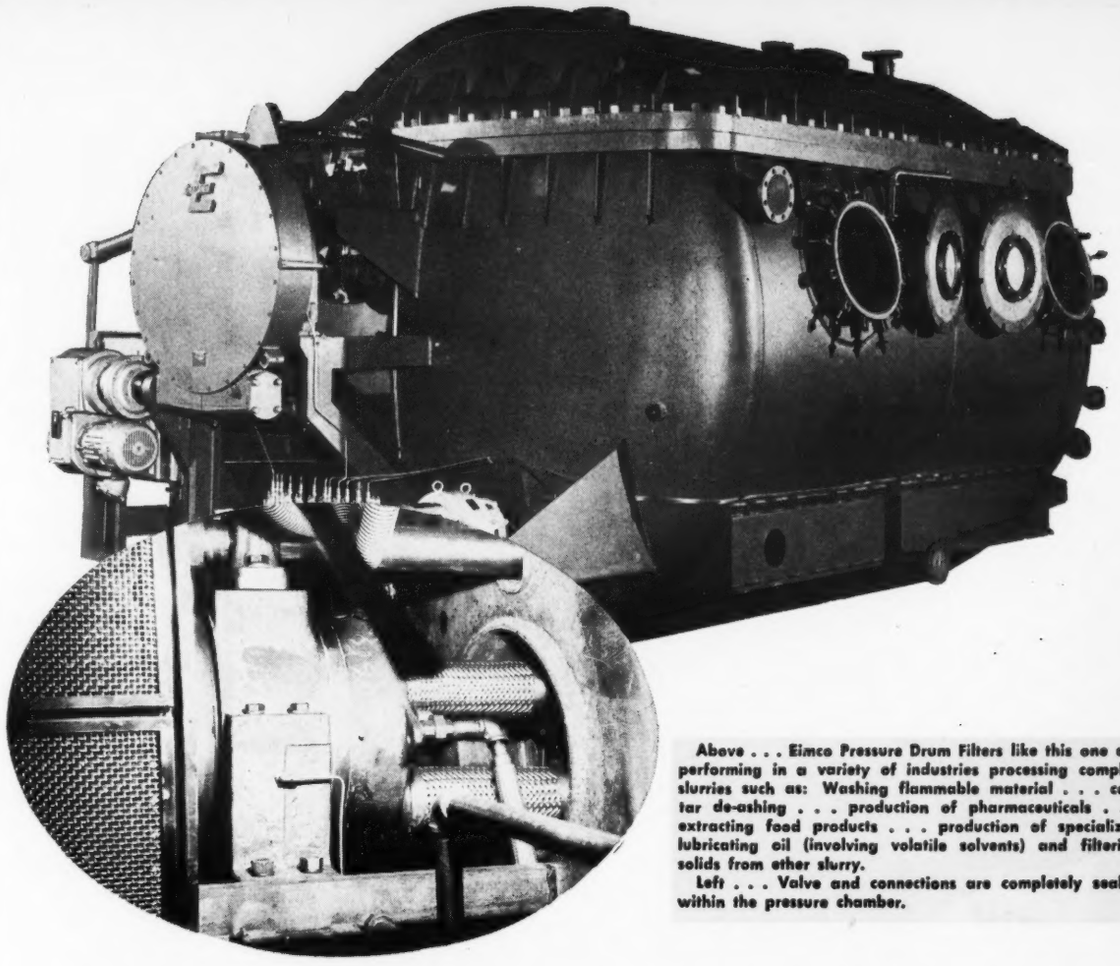
Tensioning bolts are buried inside screen's insulating tensioning rails

Single-phase transformers are available to operate either 220-, 440-, or 550-volt circuits. One transformer may be used to heat two screens. With this arrangement, screen cloth on each must be the same mesh size and weight to maintain proper balance of resistance.

("Unilec" dual-heating equipment for vibrating screens is product of Universal Vibrating Screen Co., Dept. CP, Deane Blvd. and St. Paul RR, Racine, Wis. . . . or for more information check 2351 on convenient Reader Service slip located opposite last page.)

"Now that's what I'd call a real stop-cock grease!"

Thanks to Tom Sarvay, New Product Development Division of Diamond Alkali's Research Center.



Above . . . Eimco Pressure Drum Filters like this one are performing in a variety of industries processing complex slurries such as: Washing flammable material . . . coal tar de-ashing . . . production of pharmaceuticals . . . extracting food products . . . production of specialized lubricating oil (involving volatile solvents) and filtering solids from ether slurry.

Left . . . Valve and connections are completely sealed within the pressure chamber.

Here Are 5 Major Process Conditions...

where correct application of Eimco Pressure Filters will get you appreciable advantages:

(1) Where vapor pressure of the liquid at the filter feed temperature is too high to permit the efficient use of vacuum . . . **(2)** Where liquid viscosity is high (generally 100 centipoises or more) or solid particle size is very small, requiring a driving force greater than one atmosphere to get economic filtration rates . . **(3)** Where large labor savings and lower operating costs justify higher initial expenses . . . **(4)** Where employment of a valuable or high temperature gas for the production of a dried cake product is feasible . . . **(5)** Where filtration of saturated solutions results in excessive crystallization with a reduction in temperature or pressure.

Whether you are pre-planning for filter installations to handle new processes or are seeking to improve present operations . . . these are some of the general conditions that justify an investigation into **Eimco Continuous Pressure Filter Equipment.**

Submit your problem to the Eimco Research and Development Center, Palatine, Illinois. They have complete facilities to test your slurry on all types of filtration equipment to assist you in selection of a proper unit.

After exhaustive tests, if research shows that pressure filtration can be correctly applied to your problem, you will find that Eimco Pressure Filters offer you production (and profit) advantages.

Whatever your filtration problem, let Eimco's competent research facilities go to work for you. Write today!

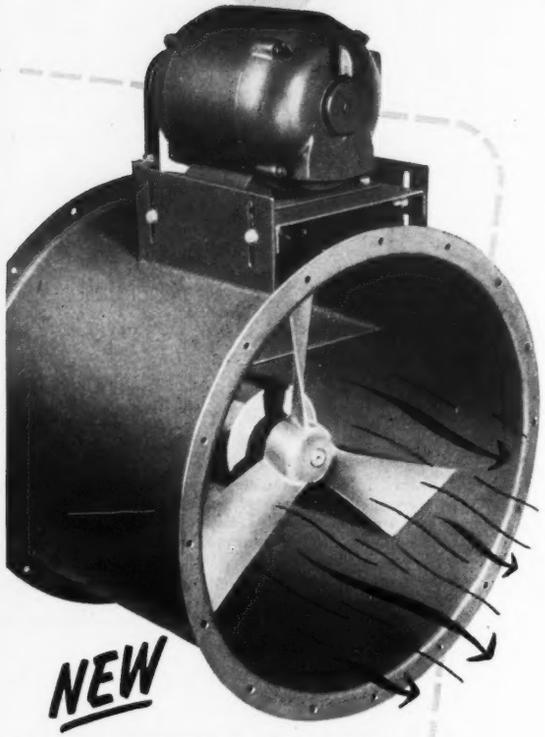
THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

B-237

When inquiring check 2352 opposite last page

expel
FUMES, HEAT AND DUST
at LOW COST



NEW

PROPELLAIR®

belt driven Tubeaxial Fans

Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-C

R&M PROPELLAIR®

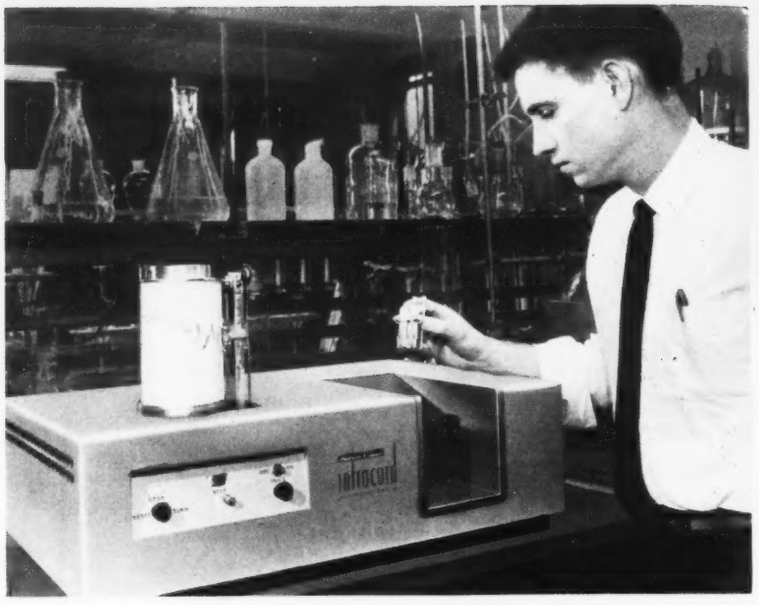
DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO

Certified Ratings

MAN COOLER SKY-BLAST VANEAXIAL EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

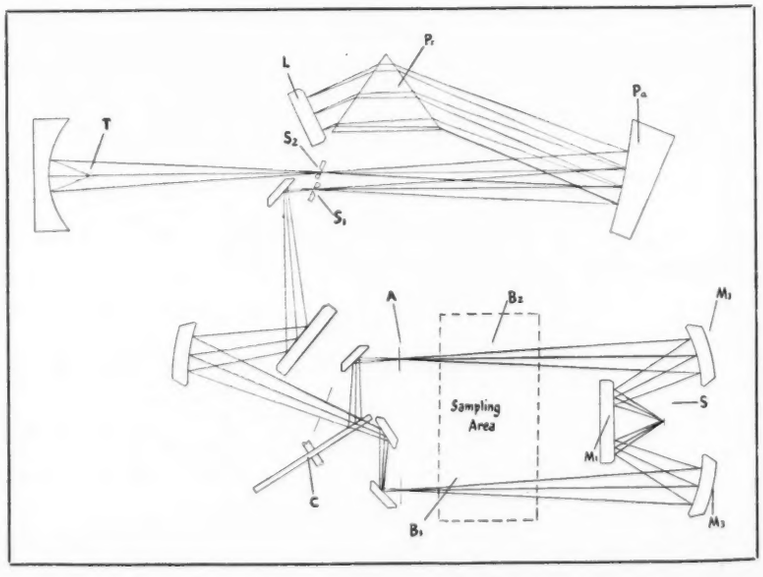
When inquiring check 2353 opposite last page



Chemist prepares to insert sample. Spectrum is automatically recorded on note book size paper

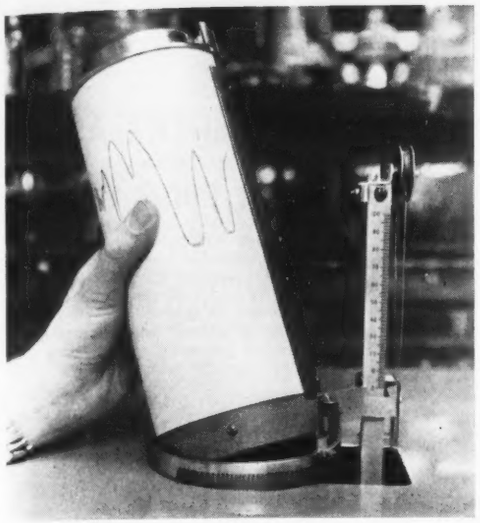
Low-cost infrared spectrophotometer offers simplicity of operation and reliability for . . .

INFRARED ANALYSIS RIGHT ON THE



Optical diagram of spectrophotometer: Infrared radiation from source (S) is split into two beams (B_1, B_2) by a system of mirrors (M_1, M_2, M_3). It passes through the sampling area, and is recombined by a system of mirrors and a chopper (C). Recombination is such that light passes alternately every 1/26th of a second from beam B_1 or beam B_2 into entrance slit (S_1) of dispersing system.

Radiation is collimated by an off-axis paraboloid (P_a), passed through salt prism (P_r), and into Littrow mirror (L). Angle of Littrow mirror selects wavelength which passes out the exit slit (S_2) and which then is focused on thermocouple (T). "A" is a servo-controlled optical attenuator.



Recorder drum easily demounts from instrument for fast paper interchange. Drum can be reset to starting position for next scan in seconds

ON THE BENCH

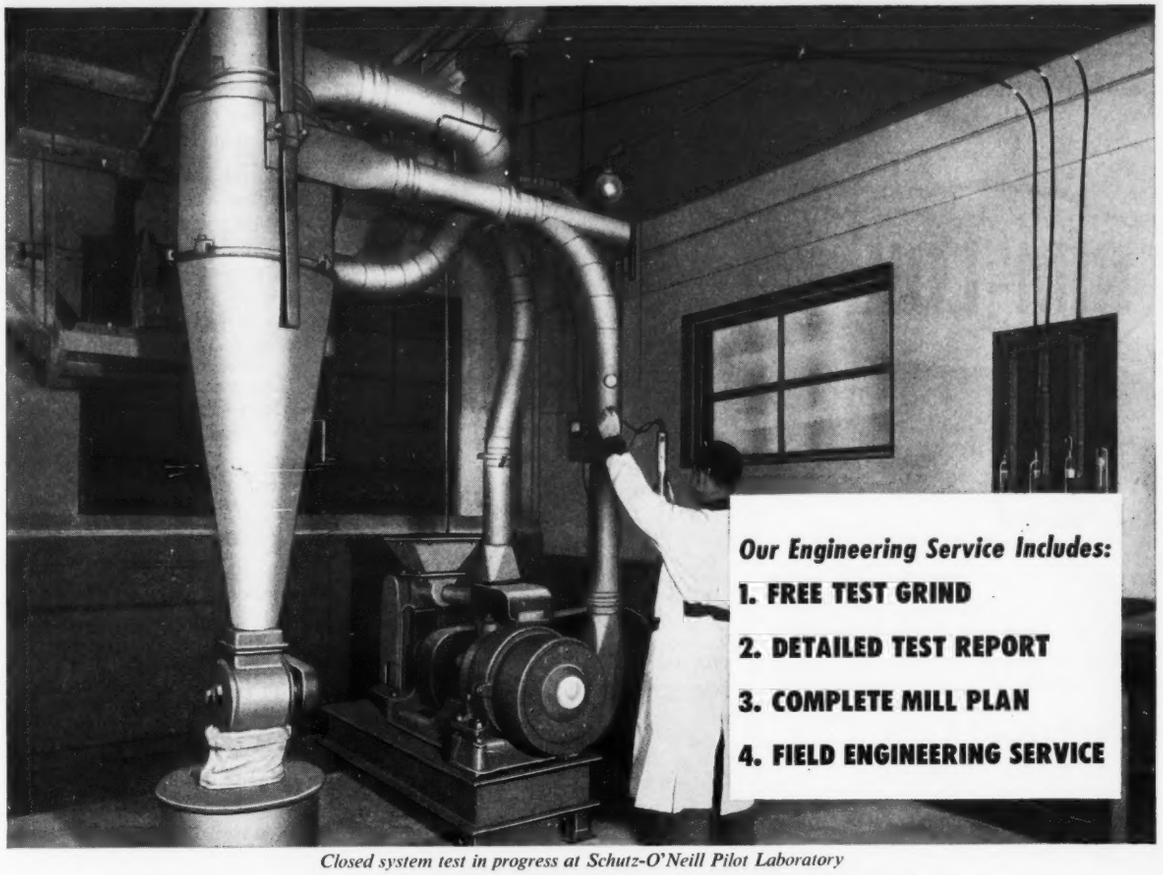
. . . of the organic chemist

Uses: As simple-to-operate infrared spectrophotometer for fast purity checks of raw materials, recording progress of an organic synthesis, elucidating molecular structure, and precise quantitative analysis. Instrument will often make it possible to completely analyze a material, both qualitatively and quantitatively, in fifteen minutes . . . and have a permanent record of the analysis.

Features: Infrared spectrophotometer is a small, compact unit that is simple to operate. Requiring no services other than 120v AC 60 cycle power, the instrument has been designed for infrared analysis "right on the bench" of the organic chemist. Instrument is sufficiently low-cost — less than $5000 — to make it practical for small companies and laboratories.

(*Please turn to page* 160)

ENGINEERED PULVERIZING


Our Engineering Service Includes:
1. FREE TEST GRIND
2. DETAILED TEST REPORT
3. COMPLETE MILL PLAN
4. FIELD ENGINEERING SERVICE

Closed system test in progress at Schutz-O'Neill Pilot Laboratory

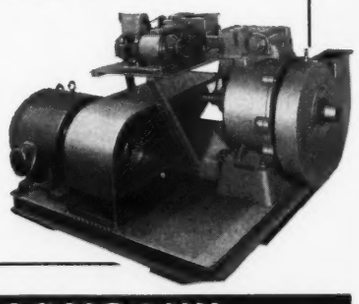
with SCHUTZ-O'NEILL

Schutz-O'Neill applies more than 60 years' engineering experience to the study of your pulverizing problems. Our engineering service plan provides maximum assurance for high production efficiency and most economical operation on all Schutz-O'Neill Pulverizer installations.

Schutz-O'Neill Pulverizers are air-swept machines using a built-in classification system for critical control of powder specifications. Maximum flexibility is possible by simple control adjustments for grinding to a full range of fineness from coarse to low micron sizes. The machines will handle most dry, fibrous, or other grindable stocks; even those containing moderate percentages of oil or moisture. Open or closed systems can be used with these pulverizers and the air stream can be reduced in oxygen, or completely inerted for explosive materials. Superheated gas streams can be employed for flash drying, or refrigerated air can be used for heat sensitive materials.

FREE
PILOT LABORATORY TEST

Write today for descriptive literature on Schutz-O'Neill Pulverizers and details of our free test grinding service.



ESTABLISHED 1893

SCHUTZ-O'NEILL COMPANY

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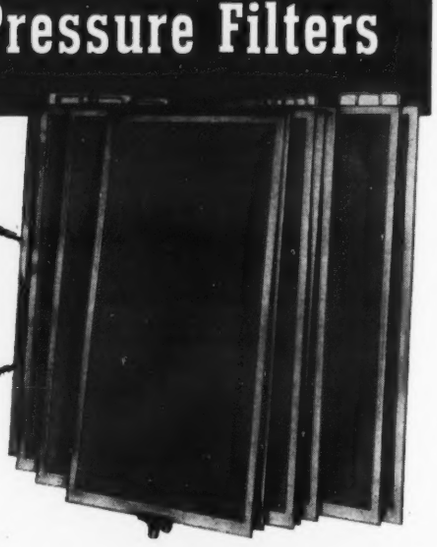
When inquiring check 2354 opposite last page

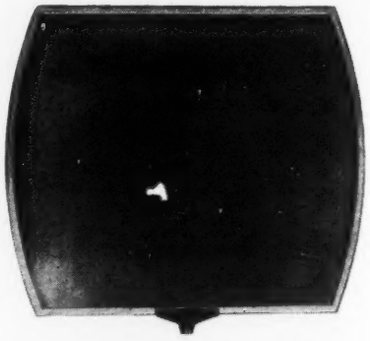
A Better Filter Leaf for Your Pressure Filters

RIM-LOK



Rectangular RIM-LOK leaves for vertical tank filters. Square corner design and narrower rim of frame yield greater filtering area.

- **Absolutely Leakproof Construction,** using a single continuous mechanical lock seam between metallic filter cloth and frames, without use of rivets, bolts or solder.
- **Facilitates Cake Discharge—** Smooth frame surface presents no obstacle in scraper blade operations.
- **Withstands Hard Usage—** Rugged frame assembly takes the punishment of heavy hammering in dry cake discharge.
- **Costs Less** than conventional filter leaves initially, in operation and in re-covering.



Arc-side RIM-LOK leaf for horizontal tank filters. Larger radius frame offers greater leaf rigidity and strength; maintains full effective filtering area.

- Increased chamber capacity assures low pressure drop for uniform precoating, even on the largest leaves.
- Larger cross-sectional area of frame permits better drainage of filtrate.

Write for Bulletin 571

MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE • NEW YORK 59, N. Y.

When inquiring check 2355 opposite last page

Infrared Analysis

(*Continued from page* 159)

Major advantage of the newly-developed instrument is that a background in infrared instrumentation is not necessary to operate it. Manufacturer mentions that the spectrophotometer is far less complicated to use than an analytical balance.

Description: Developed to be used as an everyday tool by the chemist, the instrument is a double-beam infrared spectrophotometer scanning a spectral range from 2.5 to 15.0 microns. Resolution is 0.05 microns at 10 microns. Wavelength accuracy is 0.03 microns throughout the rocksalt region. Wavelength accuracy is better than 0.01 microns.

Simplicity of operation requires only that a piece of chart paper be placed on a drum, the sample inserted, and start button pressed. Unattended instrument will then record a permanent record on 8½ x 11 inch notebook paper. Multiple curves can be recorded on a single sheet of paper.

Recorder drum synchronizes with any wavelength position, being directly coupled to the wavelength cam and automatically positioning itself at the starting point. Instrument stops at 15 microns; no runback time is required. Drum is turned back manually to starting position or any other wavelength of interest.

Though design of an infrared spectrophotometer is necessarily complex, the recently-developed instrument has only four operating controls; off-on switch, stop-start switch, a 100% transmittance adjusting knob, and a manual slit control. Slit adjustment can be used for recording spectra at a slit program which automatically provides constant energy to the system. It can also be used for wider manually-controlled slits operation.

One more design feature of instrument is that it has preset operating parameters for versatility. Spectrophotometer will perform routinely analyses now being carried out by more complex instruments.

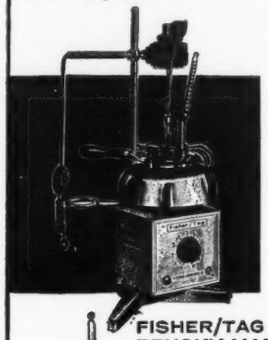
Spectrophotometer is only being introduced after four years of research and development. Manufacturer is aiming at putting infrared analysis on same basis as ultraviolet. Prime purpose in developing the instrument was to make it so simple and rugged that chemists without any special training in instrumentation could use it easily.

Spectrophotometer is self-contained unit which measures 27½ x 17 x 8½ inches and weighs 120 pounds. Noise level is ±1% and quantitative accuracy is 1%. Scattered light is less than 5% at 15 microns.

(Infracord spectrophotometer is product of Perkin-Elmer Corporation, Dept. CP, Norwalk, Conn. . . . or for more information check 2356 on convenient Reader Service slip located opposite last page.)

FISHER/TAG
ASTM
FLASH POINT TESTERS

There is an improved Fisher/Tag Flash Point Tester for every official ASTM method: open and closed models, electrical, alcohol and gas-operated. Each instrument gives you complete control of every step in your flash point tests of petroleum products, asphalts and animal or vegetable oils.



FISHER/TAG PENSKY-MARTENS CLOSED TESTER

The Pensky-Martens Tester gives reproducible results with viscous materials with flash points below 300°F. Full, reproducible control of the heating rate makes it easy to use for waxes, too.

FISHER/TAG TAG OPEN TESTER

The new Fisher/Tag Open Tester increases the reproducibility of tests for determining flash points of paints, varnishes, lacquers, vegetable oils and related products which flash below 175°F.

Send for Detailed Bulletin; write to
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America's Largest Manufacturer-Distributor of Laboratory Appliances and Reagent Chemicals

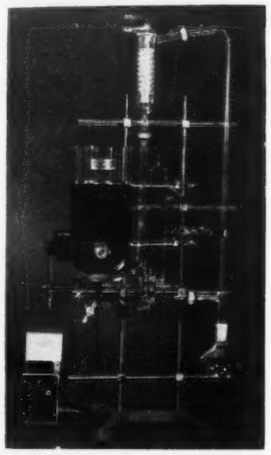
When inquiring check 2357 opposite last page

Extracts polar solvents at rapid rate

Uses: As liquid-liquid extractor for solvents heavier than water. Extractions of very polar or soluble compounds can be made at rapid rate.

Features: Extractor avoids turbulence with use of rotating glass ball so emulsion formation does not occur.

Description: Solute is extracted from large volume of liquid into small volume of solvent by use of rotating, hollow, glass ball. Small quantity of solvent is placed in 1-liter round-bottom flask. Approximately 500 ml of same solvent are placed in reservoir. Aqueous phase is then carefully introduced into reservoir. Application of heat to flask drives small quantity of solvent over for condensation and addition to reservoir. Rotating ball then mixes two phases in reservoir. Adjustable arm from bottom of reservoir returns extracted solute to liter flask during continuous opertaion.



Rotating glass ball of liquid-liquid extractor is contained in reservoir (center). Extracted solute is passed into liter flask at right

Liquid-liquid extractor consists of glassware, support assembly, variable- speed motor with motor bracket, and thyratron controller. Extractor operates on 115v AC, 60 cycles.

(Rinco rotary film extractor is product of Scientific Glass Apparatus Co., Inc., Dept. CP, 100 Lakewood Terrace, Bloomfield, N.J. . . . or for more information check 2358 opposite last page.)

Metallurgical laboratory equipment

Sixteen-page catalog covers line of optical instruments, polishers, furnaces, furniture, and other equipment for the metallurgical laboratory. Photographs and price lists are included.

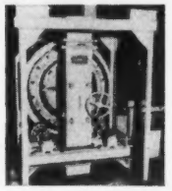
Catalog is issued by Harshaw Scientific Division, The Harshaw Chemical Company, Dept. CP, 1945 E. 97th St., Cleveland, Ohio. When inquiring specify 2359 on form opposite last page.

HIGHLY INTIMATE BLENDS IN 3 TO 5 MINUTES

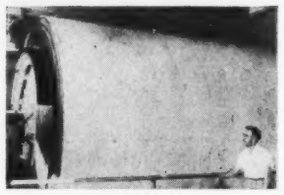
Sturtevant blending continues during discharge - no segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials — within 3 to 5 minutes of start of charging.

Six *complete* blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat — is highly effective yet gentle and safe even with explosives.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N.C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way — circular, vertical and two lateral.

Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

Self-cleaning, dust-sealed drum; fast, one-man accessibility

Operation of Sturtevant Blenders is self-cleaning. Drum interiors are completely dust-sealed; special design of stuffing box fully seals against leakage. For inspection of all models, one man simply loosens a few lugs to remove manhole cover — quickly and easily.

Fully or semi-automatic, or manually controlled operation

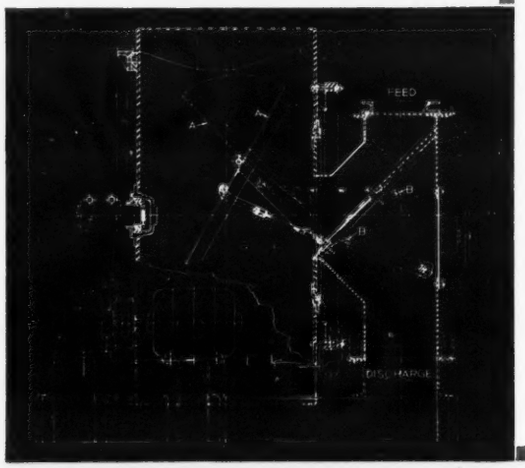
Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs — can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (See coupon for available bulletins on other Sturtevant machinery.) Write today.

STURTEVANT MILL CO.

Nine standard models with capacities to 900 cu. ft.

Pilot plant blending to largest production runs are handled by standard models of Sturtevant Blenders with capacities from 10 cu. ft. to 900 cu. ft. Rotary drum design is a proven spacesaver, including headroom. Write for Bulletin No. 080B giving complete specifications.



Sectional view of Sturtevant Blender
'A' (solid line) shows swinging chute in blending position; 'B' (solid line) shows gate closed for blending. 'A' (dotted line) shows swinging chute in discharging position; 'B' (dotted line) shows gate open for discharging.

My dry-process materials are: _____

Desired capacity is: _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

STURTEVANT MILL COMPANY, 119 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Blenders ☐
Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ AIR SEPARATING ☐ MIXING
☐ SCREENING ☐ GRANULATING ☐ CONVEYING

When inquiring check 2360 opposite last page

"NETONE" Filter Paper

- HIGH TENSILE STRENGTH
- HIGH BURST FACTOR
- ABRASION RESISTANT
- CREASE RESISTANT
- CHEMICAL RESISTANT

"NETONE" Filter Paper is a neoprene impregnated kraft paper that offers decided mechanical and chemical advantages over standard filter papers.

When compared to 60-pound unbleached kraft "NETONE" Filter Paper shows a 500% increase in wet tensile strength, wet burst factor increases from 6 to 57 and there is a marked increase in abrasion and crease resistance.

The following are a few test results indicating comparative resistance factors.

Solution	60-Pound Kraft	Wet Strength Resin	Neoprene Treated (3%)
H_2O	0	72 hr.	86 hr.
10% HCL	0	6 min.	4 hr.
10% NaOH	0	6 hr.	72 hr.

Write us about your requirements and we will be glad to send samples for your testing.

. . . And for your filter cloth requirements we weave fabrics of VINCEL*, Saran, Nylon, ORLON**, Glass, TEFLON††, DACRON*** and Polyethylene. Samples sent on request.

* TM—NFM Reg. U.S. Pat. Off.
** TM for Du Pont acrylic fiber
*** TM for Du Pont polyester fiber
†† TM for Du Pont tetrafluorethylene fiber

Weavers of Industrial Filter Media for over Fifty Years

The National Filter Media Corp.

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When inquiring check 2361 opposite last page

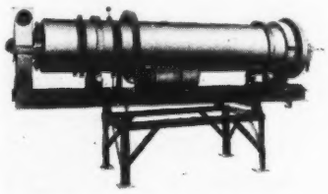
LABORATORY

Small capacity dryer is package unit

Uses: As pilot plant or laboratory rotary dryer. Unit is also applicable for small capacity unit processes requiring low temperature drying, either intermittently or continuously.

Features: Dryer is self-contained and requires only fuel and electrical connections to be placed in operation.

Description: Dryer is arranged with ten steam tubes having a total heating surface of approximately 42 sq ft. Tubes connect



Shell rotation speed of lab dryer can be varied

with steam header at discharge end of dryer. Speed of shell rotation and shell slope can be varied to change material flow rate through dryer.

Unit is arranged for use with any available steam supply or can be furnished with a 3-hp steam generator. Dryer is available in stainless steel, aluminum, nickel, and other corrosion-resistant materials. Evaporative capacity is 30 lb/hr.

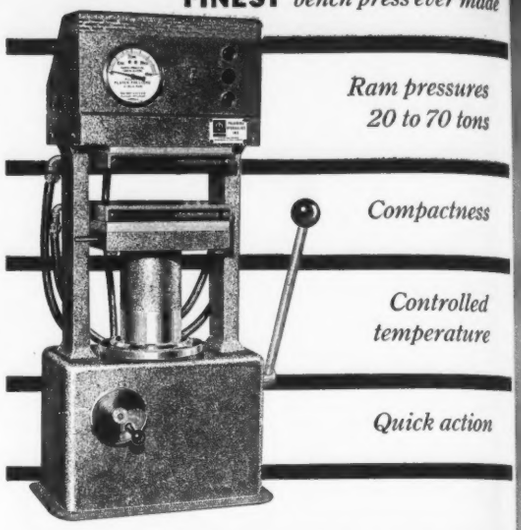
(Model XC laboratory dryer is product of Hardinge Company, Inc., Dept. CP, York, Pa. Check 2362 opposite last page.)

Features spectograph for laboratory

Two color catalog of eight pages illustrates and describes industrial grating spectrograph. Booklet includes reproductions of spectrograms.

Cat SL-456 is issued by Jarrell-Ash Company, Dept. CP, 26 Farwell Street, Newtonville, Mass. Check 2363 opp. last pg.

FINEST *bench press ever made*



We build presses for every purpose in the fields of rubber and plastic moulding, laboratory testing and graphic arts. Write for circular or if you prefer we'll have our nearest representative call on you. . .

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When inquiring check 2364 opposite last page

INSURE AGAINST OBSOLESCENCE

with a SPERRY FILTER PRESS

—Custom engineered to meet your specific requirements. Exact capacity . . . uniform product purity and stability.
—Ruggedly built to provide many years of trouble-free service. Minimum wear. Low maintenance.
—Adaptable for conversion to any type of filtration operation should changes in your product or process ever become necessary.
Sperry Filter Presses are available in a wide variety of materials and capacities. Write today for the complete catalog.

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City_____ State_____

When inquiring check 2365 opposite last page

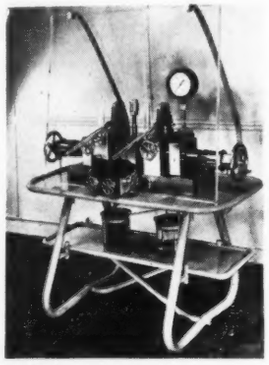
Provides extreme high pressure for polymer research . . .

precision-built press will give pressures to 150,000 psi; is complete unit

Uses: To provide source of high-pressure in polyethylene and other polymer research.

Features: Precision-built high-pressure presses will provide pressure to 150,000 psi. Balanced end valves have a differential valve spindle for opening and closing at high pressure.

Description: Two models of Hart presses are available; one for 150,000 psi and another for 75,000 psi. Both have a cylindrical pressure chamber of high alloy steel, two hand pumps, an intensifier, screw press, two connection blocks, two balanced end-valves, and a division block. The presses are complete units mounted on baseplates.



High-pressure press is complete unit

To obtain pressures to 150,000 psi, a hand pump activates an intensifier with a ratio of 1 to 30. Thus with a pressure of 5000 psi in the pump, pressure in main cylinder becomes 5000 times 30 or 150,000 psi. Hand pump plunger has been designed with a diameter that makes pumping easy.

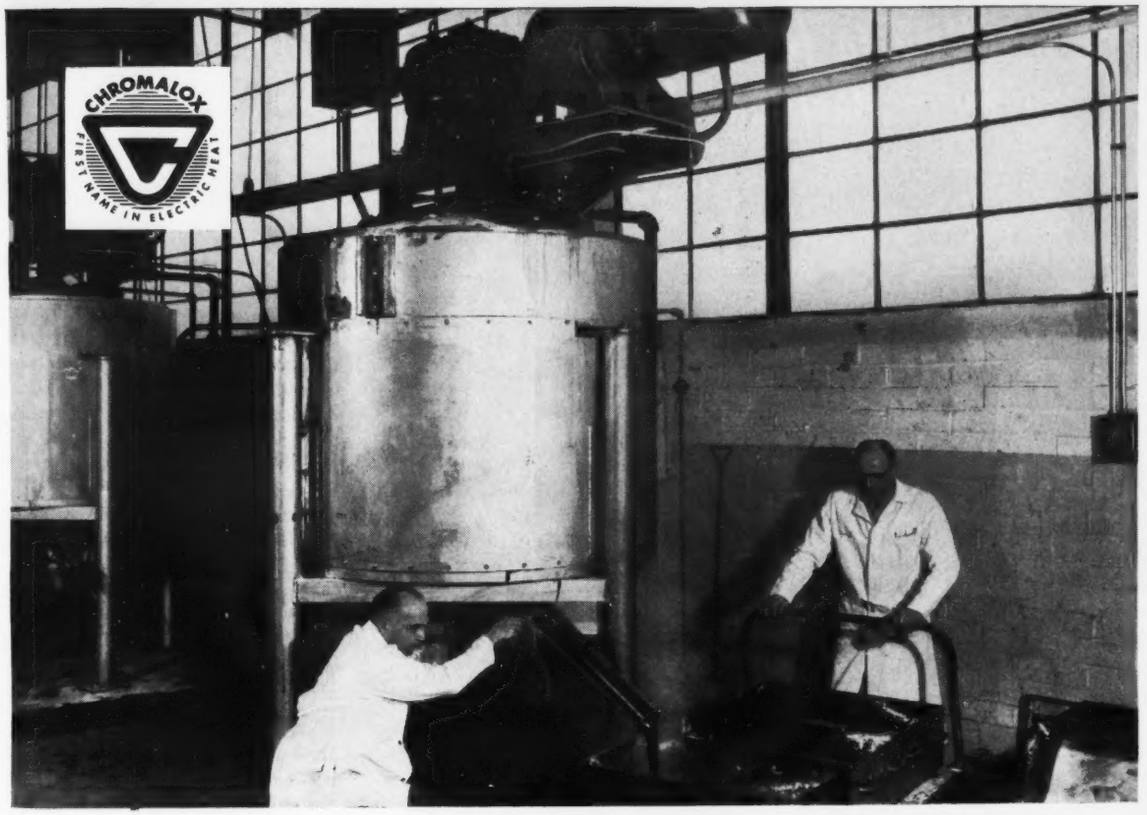
In 75,000 psi unit, a screw press is built into the assembly for accurate adjustment in raising or lowering pressure. This unit is operated with a hand wheel through a reduction gear which moves a small diameter plunger in an intensifier attached to main cylinder.

(Hart 150,000 and 75,000 psi presses are available from Instruments Division, North American Philips Company, Inc., Dept. CP, 750 South Fulton Ave., Mount Vernon, N. Y. . . . or for more information check 2366 opposite last page.)

Shows steel furniture for lab

Recording spectrophotometers and gas chromatographs are among equipment listed in 12-page catalog. Four-page section illustrates company's new line of steel laboratory furniture.

"Lanco Apparatus News," Vol 8, No 1, is issued by Arthur S. LaPine & Company, Dept. CP, 6001 South Knox Ave., Chicago 9, Ill. Specify 2367 opposite last page.



versatile electric heat . . .
"cooks" special purpose lubricants

Creating laboratory-like conditions for batch processing special purpose lubricants was accomplished by a large manufacturer of lubricants with the help of Chromalox electric heating units.

Precise, controllable heat to produce the viscosity and chemical reactions necessary for the formulation of many different valve lubricants was obtained by installing Chromalox electric strip heaters on the processing kettles. Grouped into three zones, they supply selective, modulated heat at heat-up and operating temperatures. Since many of the critical chemical reactions take place at temperatures near the flash point of the raw materials, flameless electric heat provided an extra measure of safety.

The electrically heated kettles are used for processing a wider variety of lubricants since the temperature range is greater and input is varied to meet the conditions for batches formulated for widely differing service conditions.

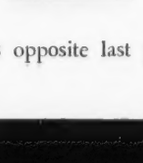
In addition to meeting these exacting operating requirements, Chromalox electric heaters have recorded a real dollars-and-cents advantage in upkeep costs. With no moving parts, totally enclosed, metal-sheathed Chromalox strip heaters have built up three years of maintenance-free service.

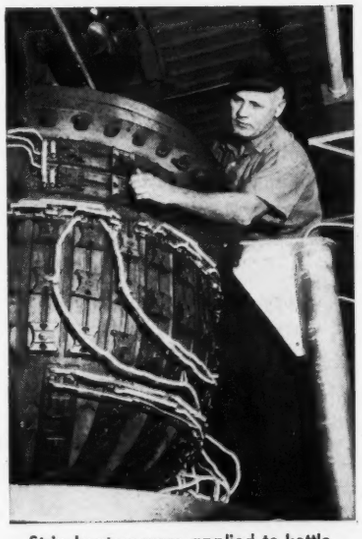
Substantial operating benefits like these, in addition to low cost process heat, have made Chromalox electric heating units an important part of the major production processes in industry today.

Always available to you are our research, engineering, design and modern manufacturing facilities. Choose from 15,000 standard sizes, styles and ratings in the world's largest factory stock of industrial electric heaters. Our nationwide sales-engineering service will go all out to help you find the right answer—electrically.

•

FREE—application information on strip heaters. Write for Bulletin F-1566 to see how Chromalox Strip Heaters can help solve your process heat problems.





Strip heaters were applied to kettle by means of stud bolts welded in place.

EDWIN L. WIEGAND COMPANY
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Here's How to Handle Corrosives at High Peripheral Speeds

CHEMLON YARN PACKING STYLE C-30 Made of TEFLON* FIBER BY "JOHN CRANE"

Chemlon Yarn Style C-30 extra tough packing gives you two important advantages not provided by other types of braided or molded Teflon packing: 1) positive sealing efficiency at high peripheral speeds; 2) cooler running stuffing box under severe service conditions.

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HERE'S PERFORMANCE PROOF:—Fluid handled: 45% H_2SO_4 (impure) at 170°F.—Operating conditions: 1¼" pump shaft at 1700 rpm. or 555 fpm. peripheral speed. Results: 46 days good service. Previous best service record 7 to 10 days.

Chemlon Yarn Packing Style C-30 is available in spool or coil form, in a wide range of sizes from ⅛" up. *Can be lubricated with Teflon suspensoid or various types of lubricants.*

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*DuPont Trademark

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briefs

from contemporary publications

Absorption of CO_2

Improved process for removing carbon dioxide from pressurized gases by absorption in hot potassium carbonate solutions has been developed. Experiments with mixtures of carbon dioxide and nitrogen in a 30-ft absorber and 25-ft regenerator are reported. Six pages, three tables, six figures, four references. (*"Chemical Engineering Progress," October* 1956, *page* 433.)

Stabilization of fats

Results on stabilization of edible fats during rendering are presented. Lard and edible beef fats can be stabilized with phenolic antioxidants. Poorer results are obtained in presence of propylene glycol. Three pages, six tables, six references. (*"Journal of the American Oil Chemists' Association," September* 1956, *page* 381.)

Underground corrosion

Electrochemical aspects of underground corrosion and cathodic protection are presented. Methods of combating corrosion are given in some detail. (*"Electrochemical Engineering," October* 1956, *page* 907.)

Continuous analyzers

Successful performance of continuous stream analyzers requires close cooperation between instrument manufacturers and users. Preventive maintenance will improve performance. Four pages, five figures. (*"I.S.A. Journal," September* 1956, *page* 310.)

Corrosion of aluminum

Studies of aqueous corrosion of aluminum alloy 1100 are reported. Effects of alkali and dichromate ions are also covered. Eight pages, four tables, seven figures, 13 references. (*"Corrosion," September* 1956, *page* 31.)

Phenolic resins

Phenolic content of resins of unknown origin can be estimated by means of a colorimetric method. Method is quantitative when nature of the raw materials is known. Three pages, one table, three figures, five references. (*"Analytical Chemistry," September* 1956, *page* 1461.)

Solar energy

Practical applications of solar energy are discussed under headings of history, present uses, and future uses. Solar refrigeration and photochemistry are covered. Four pages, 10 photographs. (*"Consulting Engineer," September* 1956, *page* 67.)

Ammonia data

Equilibrium data for ammonia are presented in graphical form. These are of value in the design of ammonia equipment. Three pages, four references. *("Petroleum Refiner," October 1956, page 163.)*

Plant layout

This paper will interest chemical engineers who lack an adequate book on plant design. It deals with selection of sites, buildings, material handling, and layout. Six pages, six photographs. *("Consulting Engineer," October 1956, page 54.)*

Radioactivity in water

Methods for determining radioactive water pollution have been developed, and surveys of both natural and artificial radioactivity have been made. Further studies should evolve methods for assaying low levels of specific isotopes in wastes and waters. Seven pages, one table, 24 references. (*"Journal of the American Water Works Association," November* 1956, *page* 1373.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Statistical methods in coatings industries

Several papers in this symposium deal exhaustively with theory of statistics, fundamentals and tools, interpretation and analysis, applications, and developments. 44 pages, 29 tables, nine figures, 59 references. *("Paint and Varnish Production," October 1956, page 39.)*

Paper from glass flakes

Glass-flake paper impregnated with varnishes is strong and water-resistant. Electrical properties of a capacitor made from this paper are presented. Three pages, two tables, two figures, six references. *("Journal of the Electrochemical Society," October* 1956, *page* 543.)

Corrosion of aluminum

An aluminum alloy that contains about one percent nickel in 1100 aluminum appears to be safe from attack by water up to about 350°C. Test results are given. Eleven pages, eight tables, 11 figures, seven references. *("Corrosion," October* 1956, *page* 20.)

Frequency-response column analysis

Analysis of a fractionating column through methods of frequency response is covered. Suggestions for achieving better automatic control are given. Five pages, one table, seven figures, six references. *("ISA Journal," October 1956, page 412.)*

Weed control

Action and mode of activity of gamma-4-chloro-2-methylphenoxybutyric acid as a new means of weed control is described in this paper from England. Two pages, one figure, four photographs. *("Chemical Products," October* 1956, *page* 398.)

Legal problems of the AEC

Legal problems that arise from atomic radiation present the Atomic Energy Commission with a new headache. Government may enter the employes' insurance picture so that rates may not rise too much. Two pages. *("Data," October* 1956, *page* 1.)

Epoxy resins

The Diels-Alder adduct of maleic anhydride with hexachlorocyclopentadiene hardens epoxy resins and renders them flame- and heat-resistant. Five pages, two tables, nine figures, 12 references. *("Industrial and Engineering Chemistry," October* 1956, *page* 1951.)

Nuclear radiation

Nuclear radiation is considered under headings of induced radioactivity, nuclides chart, nuclear energy, radioactive damage, radiation effect on materials and health physics. Thirteen pages, 11 figures. *("Air Conditioning, Heating, and Ventilating," September* 1956, *page* 82.)

High-pressure boiler

Studies of a Russian experimental steam generating plant that operates at 4266 psi and 1112°F are reported. Pulverized coal of low volatile content and oil have been used. Designs for other similar plant are covered. Six pages, six figures, nine references. *("Combustion," September* 1956, *page* 42.)

Design by computer

Counter-current cooling towers are designed and evaluated by means of a digital computer that handles involved equations. Four pages, two tables, three figures, 10 references. *("Petroleum Refiner," December* 1956, *page* 211.)

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Acetic 50%	S	Ammonium Hydroxide 28%	S	Ethyl Alcohol	S	Carbon Tetrachloride	S
Chromic 25%	S	Sodium Hydroxide 50%	S	Methyl Ethyl Ketone	U	Plating Solutions	S
Hydrochloric 38%	S	HALOGENS		Gasoline	S	Photographic Solutions	S
Hydrofluoric 50%	L	Sodium Chloride Sat.	S	Mineral Oil	S	KEY: S—Satisfactory	
Nitric 20%	S	Ferric Chloride	S	Animal Oil	S	L—Limited to certain applications	
Sulphuric 50%	S	Sodium Hypochlorite 5%	S	Vegetable Oil	S	U—Unsuitable	
Sulphuric 98%	S			Phenol 10%	S		
				Chlorine 5%	L		
				Alum	S		

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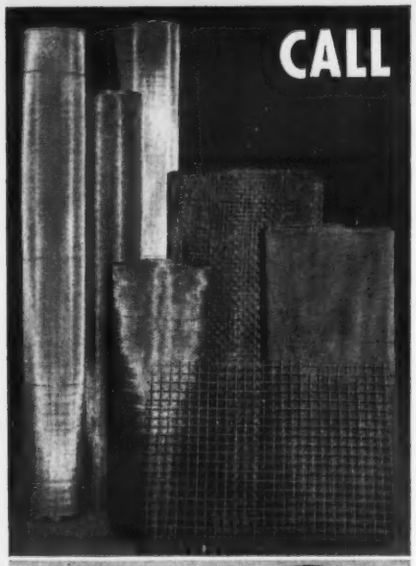

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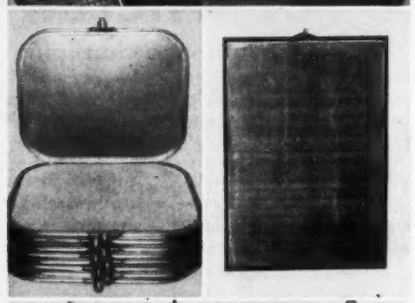

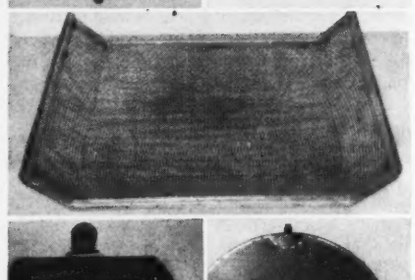

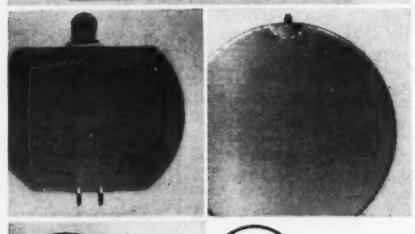

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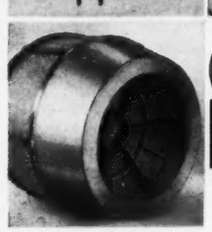

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BRIEFS

New algicides

This paper presents an evaluation of new algicides for water supply purposes. No completely new algicides can be recommended for use in public water supplies at this time. Five pages, 10 references. (*"Journal of the American Water Works Association," September* 1956, *page* 1133.)

Electronic brains

This article deals with electronic "brains" as produced by General Electric and Remington-Rand, and the electric robot of Frankfurt am Main, the "Univac Fac-Tronic II," It includes an account of Norbert Wiener, the cybernetic man of MIT. Twelve pages, 12 photographs. In German. *("Der Spiegel," October 3, 1956, page 42.)*

Nuclear gas turbine

How to control a nuclear-driven gas turbine is described. Heat cycles and reactor control are covered and a full discussion is presented. Seven pages, seven figures, seven references. (*"Control Engineering," October* 1956, *page* 71.)

pH measurements

Uses and abuses of pH measurements are discussed. History of the pH concept is traced from its origin in 1909. Eight pages, three tables, four figures, 36 references. (*"Analytical Chemistry," December* 1956, *page* 1859.)

Tester for plastics

New automatic impact tester for plastics throws new light on properties of plastic materials. Seven pages, six tables, four figures, four references. (*"Modern Packaging," November* 1956, *page* 163.)

Sludge in fuel oil

Additives solve sludge problems in fuel oil, as shown by tests reported in this paper. Dispersal and inhibition of sludge are covered. *Three pages, nine figures.* (*"Plant," December* 1956, *page* 64.)

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TEMPERATURE CONTROL

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Radiotracers and sewage

This paper deals with use in the field of I^{131} as a radiotracer in study of oxidation of sewage. Test procedures and field and laboratory results are given. Eight pages, two tables, four figures, three references. *("Sewage and Industrial Wastes," October 1956, page* 1211.)

Flotation rates

Suggestions for improving flotation rates, of value to mining and chemical engineers, are given. Experimental procedures and test results are included. Three pages, four tables, five figures, eleven references. *("Engineering and Mining Journal," October 1956, page 81.)*

Digital computers

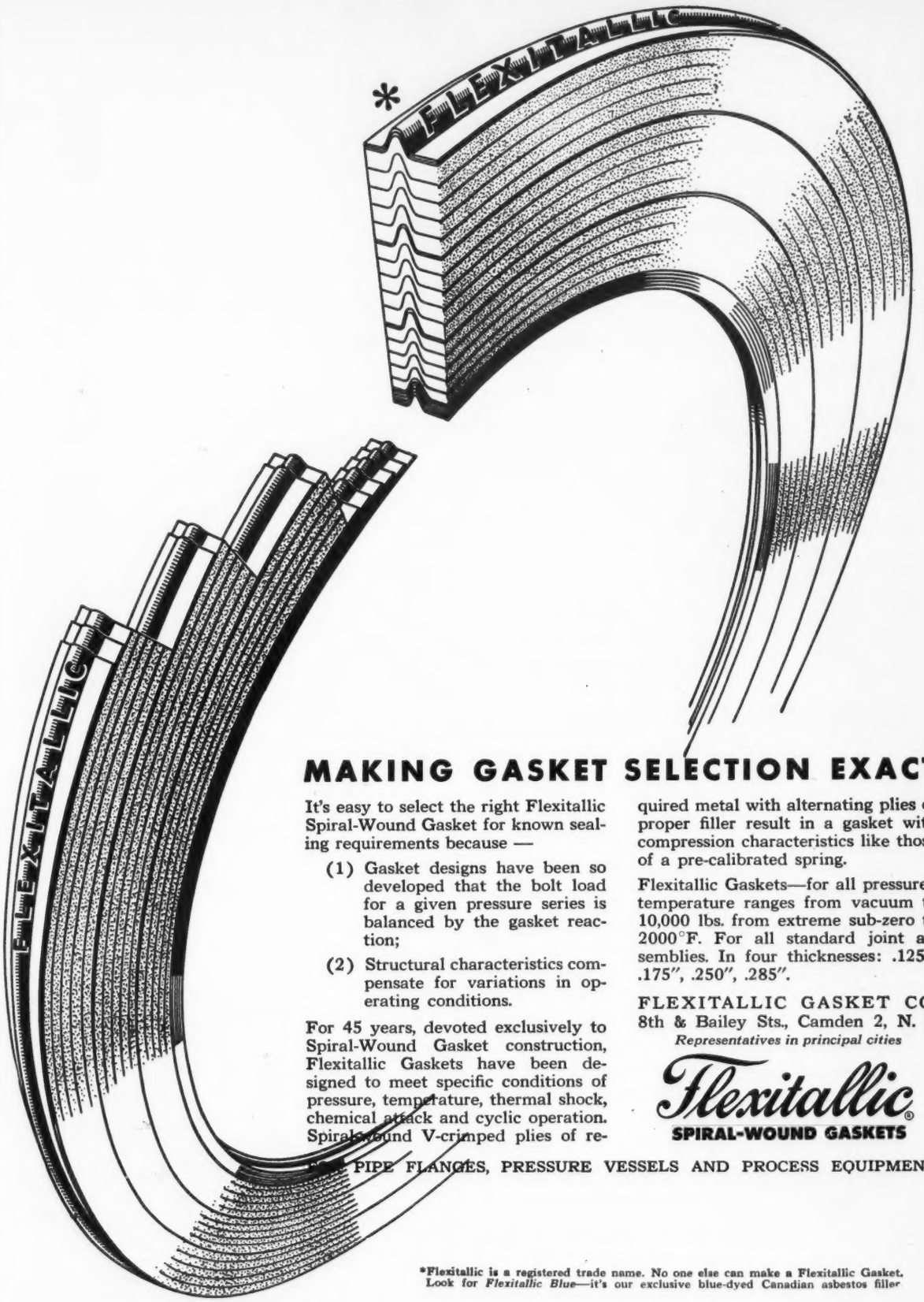
Symposium on digital computers consists of papers that bear the following titles: Computers and You, What You Should Know About Digital Computers, The Small Digital Computer Installation, The General-purpose Analog Computer, The Large Computer Installation, and By 1963 Computers May Run Plants. Twenty-two pages, four tables, 13 figures, 52 references, 20 photographs. (*"Chemical Engineering Progress," November* 1956, *page* 449.)

Carboxylic rubbers

During reclaiming, unsaturated acids react with vulcanized rubber to yield carboxylated elastomers of unique properties: low benzene extract, improved aging, high oil resistance, and high modulus. Curing mechanisms similar to those for neoprene may be used for the new polymer. Seven pages, 15 tables, four figures, 30 references. (*"Industrial and Engineering Chemistry," December* 1956, *page* 2138.)

Heat transfer

Work on heat transfer to air flowing through packed tubes is reported form England. Variation of heat transfer coefficient along the length of the bed has been studied. Thirteen pages, 9 figures, 22 references. (*"Chemical Engineering Science," September* 1956, *page* 245.)



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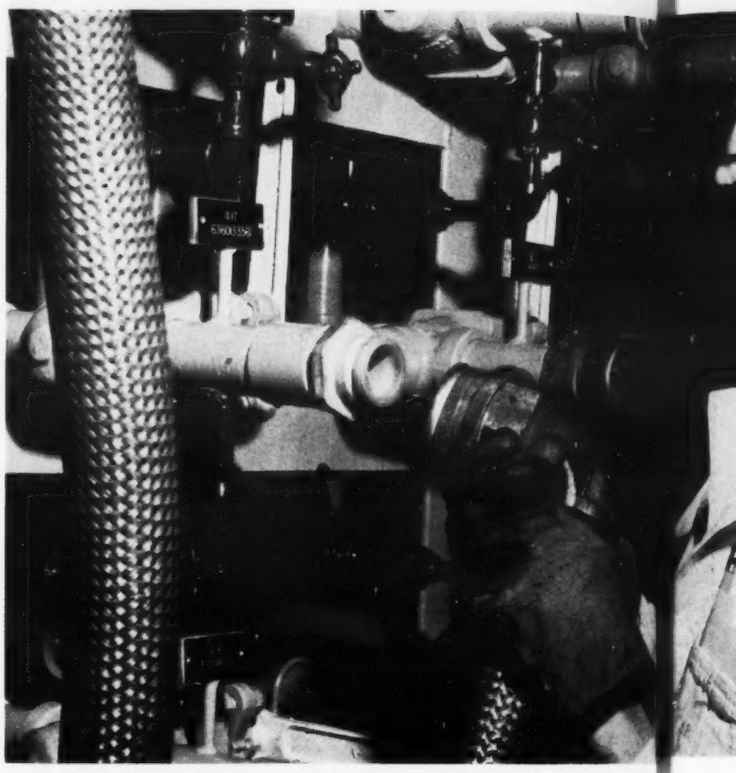
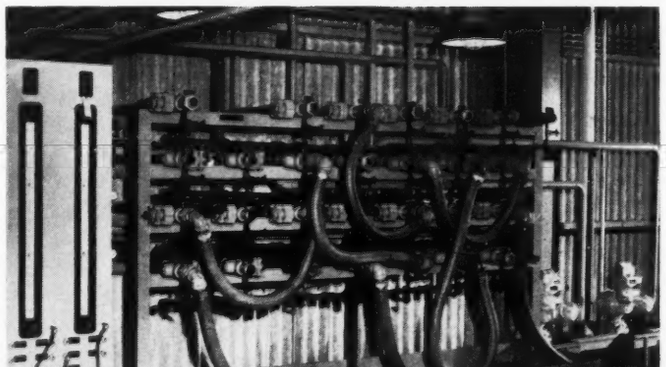


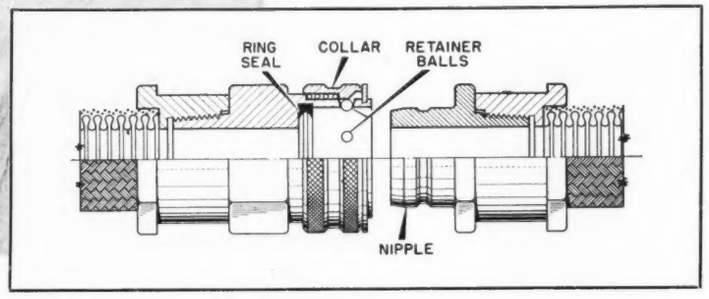
In recently installed facilities at Dow Corning Corp., Midland, Mich., conventional valve manifold used to control flow of silicone liquids has been replaced by . . .



Main switchboard in silicone fluids facilities at Dow Corning. Rotary meters (right) and manometers (left) can be quickly and easily connected to appropriate line so that flow rate can be observed

Heart of "switchboard" piping system is quick-connect coupling which provides leakproof connection at low and high pressures

Nipple butt-seals on seal ring to provide quick positive seal at low pressures. Line pressure expands "V" opening in ring to give leakproof seal at high pressures



"switchboard" transfer system that streamlines fluid handling

Quick-connect hose coupling permits rapid switching of flow patterns

Problem: Space was inadequate in existing building at Dow Corning Corp., Midland, Mich., for a conventional permanent piping system. Company wished to establish a central point for control of liquid transfer between tank farm and new equipment. New silicone fluid production facilities were part of plant expansion to increase company's capacity to produce silicone-base products for paints, water repellents, water-proofing compounds, and similar materials.

Raw materials had to be moved from field storage to desired processing vessel; intermediates shifted from one processing vessel to another, not always in same order; and product transferred to packaging machinery or storage.

Solution: Designers of Dow Corning's facilities shifted from traditional valve-manifold liquid transfer system to a

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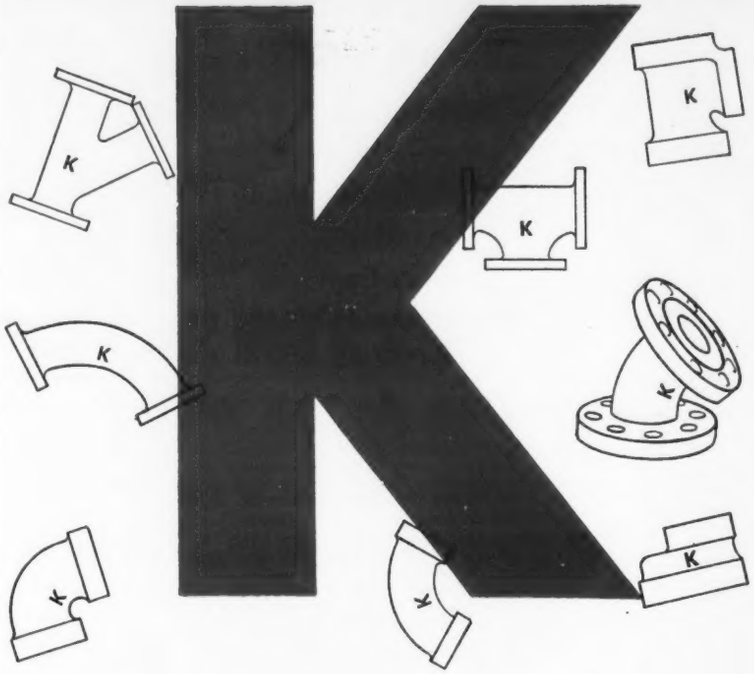

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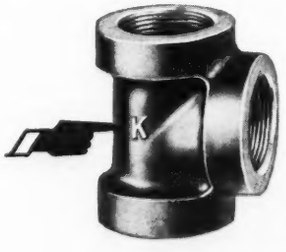

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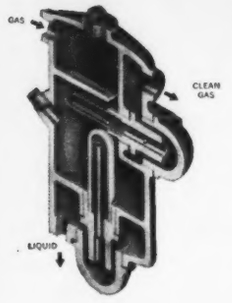

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SELAS CORPORATION OF AMERICA DRESHER, PENNSYLVANIA — *Heat and Fluid Processing Engineers* DEVELOPMENT · DESIGN · CONSTRUCTION

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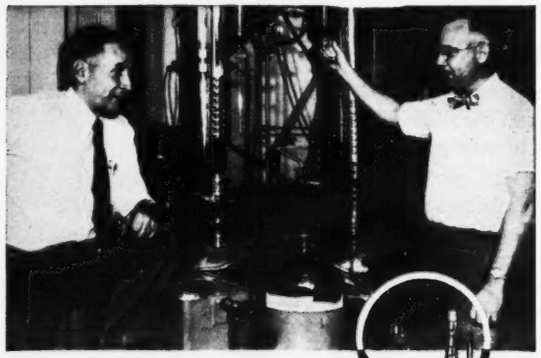


CORSON-CERVENY MICRO BELLOWS PUMP Feeds Chemicals in Esso Research Bench Scale Pilot Plant

In setting up its bench scale pilot plant to solve many problems involving simple, continuous, or vacuum distillation, solvent extraction, or chemical reaction, Esso Research & Engineering have installed a Corson-Cerveny Micro Bellows Pump to pump a wide variety of chemicals.

The Corson-Cerveny Pump is used in many laboratories where corrosive chemicals are pumped because all parts in contact with the liquid are made of stainless steel, and cone-to-taper fittings eliminate the need for packing, which is always a source of possible contamination.

Why not let the Corson-Cerveny Pump help in your laboratories? Write for bulletin and prices.

RESEARCH APPLIANCE COMPANY
Box 307 Allison Park, Pa.

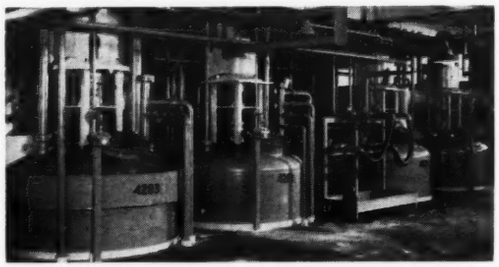
When inquiring check 2377 opposite last page

'Switchboard' Transfer System

(*Continued from preceding page*)

"switchboard" system. Fixed piping from tanks, processing units, and packaging equipment is run to a central location or switchboard. In place of multiple valve installation, lines are joined by flexible hoses which can be connected and disconnected by quick-connect hose couplings. Hose link can be rapidly shifted from one line to another, resulting in a switchboard-like arrangement.

Heart of system is quick-connect coupling which is leakproof at low and high pressures. Sealing element is a ring with a circumferential "V" opening. Pressure inside line expands opening, making seal tighter with increase of pressure. Coupling nipple seats against side of ring so that seal is made instantaneously and is leakproof. This butt seal prevents excessive wear. When ring does become worn, it can be readily removed and replaced with a long-nose pliers.



Each battery of processing units has an individual switchboard which permits operator to connect any desired capacity for a particular process

Control switchboard was connected to each battery of processing units through a separate switchboard for that battery. Metering equipment (rotary meters and manometers) were located at appropriate switchboards and connected to desired lines by flexible hose equipped with quick-connect couplings.

Results: Central point for control of all liquid flow was established in limited space available. Plant operating costs are reduced because it is not necessary to open and close a number of valves at scattered locations during switching operations. Operation is flexible.

Switchboards permit performing same processing operation in all units of a battery at same time, or one or more units can be in operation while others are being loaded, discharged, or cleaned. A single unit can be filled from a raw material tank or from another processing unit. Similarly, each processing unit can be connected to discharge to a finished product storage tank or to another processing unit. Material can be quickly and easily sequenced through any desired order of processing operations.

By locating metering equipment at point where

What's a "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem.

In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem *was solved* . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

liquid line connections are made, operator can watch flow and better control processing operation. Open pipe ends reveal at a glance which lines are disconnected and flexible connecting hose indicates connected lines. Wrong piping connections with resultant loss of valuable fluids or damage to equipment are avoided.

(Quick-connect hose coupling is product of Titeflex, Inc., Dept. CP, Springfield, Mass. . . . or for more information check 2378 on form opposite last page.)

Approaches 100% efficiency in removing all moisture and dirt from steam . . .

steam separator and cleaner removes line scale, mineral scale, rust, and oil

Uses: Cleaning high-pressure steam, exhaust steam, or compressed air.

Features: Steam separator and cleaner approaches 100% efficiency in removing moisture and dirt from steam and compressed air. Unit will remove all line scale, mineral scale, rust, oil, and liquids as well.

Description: Three standard types are available for line diameters up to 12". Larger sizes can be produced for special applications.

(Steam cleaner is a product of Bradshaw & Co., Dept. CP, 311 Ross Street, Pittsburgh 19, Pa. . . . or for more information check 2379 on form opposite last page.)

Al Kapkowski works for the Bayway Refinery of Esso Standard Oil Co., Linden, N. J.

"CLICK" lubrication starts when your machines start!

ALEMITE

OIL-MIST

AUTOMATIC LUBRICATION

provides constant, uniform, foolproof lubrication— at savings up to 90%!

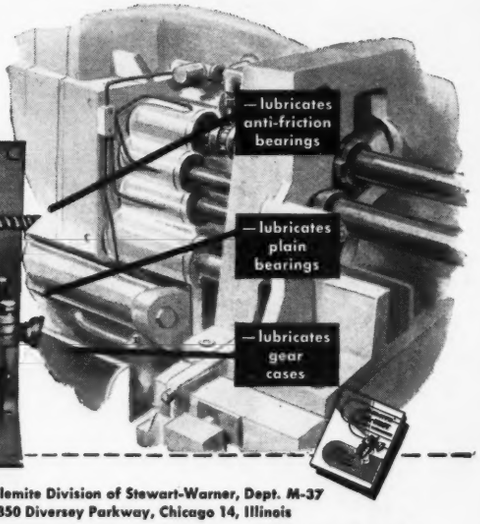
Alemite Oil-Mist *atomizes* oil into tiny, airborne particles that are distributed to bearings through tubing. It bathes all bearings with a cool film of clean oil . . . maintains uniform oil film regardless of variations in loads, temperature and speed. Simple, continuous, fully automatic. Eliminates the waste and uncertainties of the "human element" in lubrication. Uses up to *90% less lubricant* than ordinary lubrication methods!

Lubricates any bearing on any machine with one of three types of fittings:

Mist fittings for roller, ball, needle—or any anti-friction type of bearings.

Spray fittings for open and enclosed gears and chains.

Condensing fittings for plain bearings, slides, ways, vees, cams, and rollers.



8 Advantages of the Alemite Oil-Mist System

1. Continuous lubrication. Deposits fresh, clean film of oil on all surfaces of all bearings.

2. Fully automatic. Starts and stops with operation of machine switch.

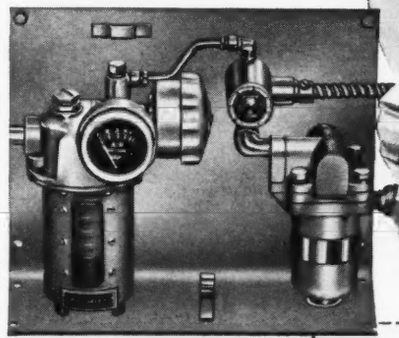
3. No guesswork. Bearings can't be overlooked, or over-lubricated!

4. Reduction of bearing temperatures. Acts as bearing coolant. Reduces bearing temperatures as much as 20°F.

5. Fewer types of oil. Reduces number of oils that must be stocked, handled and applied.

6. Elimination of downtime. All bearings are constantly lubricated while machines continue to operate.

7. Extension of bearing life. Life of grinding machine bearings have been extended from 400 to 7,000 hours!



8. As high as 90% less oil consumption. Usually consumes about 1/10th amount used by any other oiling method.

Mail coupon for Oil-Mist demonstration and information

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Division of STEWART-WARNER CORPORATION

STEWART SW WARNER

Alemite Division of Stewart-Warner, Dept. M-37
1850 Diversey Parkway, Chicago 14, Illinois

☐ Please send me a FREE copy of your new and complete Oil-Mist catalog.

☐ Please have your Alemite Lubrication Representative arrange a no-obligation demonstration.

Name .....

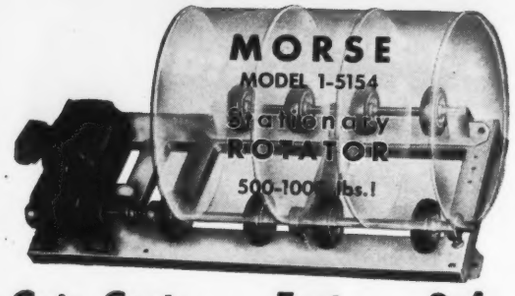
Company .....

Address .....

City ..... Zone ..... State .....

When inquiring check 2380 opposite last page

HEAVY DRUM ROTATING



Cuts Costs . . . Fast . . . Safe

You can now mix, blend or tumble loads up to 1000 lbs. with the new MORSE Model 1-5154 Stationary ROTATOR. It is primarily engineered for heavy loads in 30 to 55 gallon drums yet lesser loads can be rotated with equal efficiency. Any diameter drum can be mounted by adjusting only three bolts.

The rugged ½ H.P. motor can be geared to give any fixed speed from 5 to 30 RPM. Six inch drive wheels (4) and idler wheels (4) have Neoprene treads for smooth, non-slip revolving. Drive shaft, idler shaft and all welded steel frame are extra rugged construction for long-lasting, trouble free operation.

A double drum model No. 2-5154 with a 2000 lb. capacity is also available. Write today for brochure on complete Morse line.

MORSE MANUFACTURING CO. INC.
757 West Manlius St. East Syracuse, N. Y.

When inquiring check 2381 opposite last page

Depend on
AUTO-LITE
for
Temperature Indication

You Benefit from Eye-Level Readings

40 20 0 20 40 60 80 100
3-way adjustable mounting
Model F-1 temperature indicator
Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°F to plus 750°F. Send for latest catalog showing various types.
Rigid stem or capillary tubing for EYE-LEVEL remote reading.
THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE INDICATORS & RECORDERS

When inquiring check 2382 opposite last page

Over 400 items of electrical, mechanical equipment listed

Engineering maintenance equipment is covered in 35-page catalog that lists over 400 electrical and mechanical items. Bakelite and ceramic wire connectors, plastic clamps and straps, voltage tester, commutator resurfacers, and carbon brush seaters are among the products and equipment listed.

Cat 12 is issued by Holub Industries, Inc., Dept. CP, Sycamore, Ill. When inquiring specify 2382A on the convenient Reader Service slip which is located opposite last page.

Large, irregularly shaped vessels insulated with little cutting and fitting . . .

this flexible foamed plastic sheet insulation adapts itself to irregular surfaces

Uses: Insulation of large tanks, irregularly shaped vessels, oversize pipes, and refrigeration and air conditioning equipment.

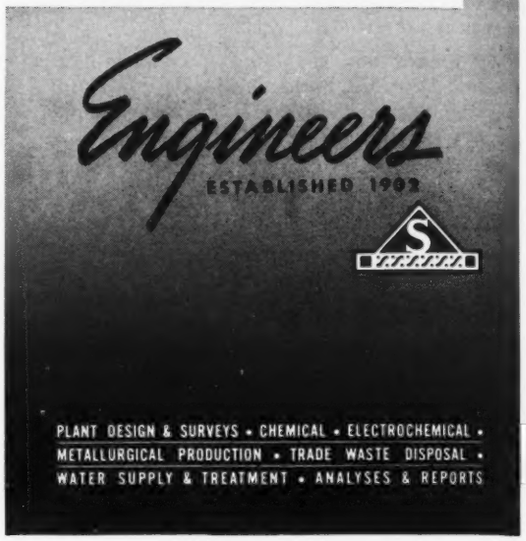
Features: Sheet insulation adapts itself to curved or irregular surfaces with little or no fitting or cutting. It can be applied to almost any clean, dry surface and does not require any mechanical support.

Installing sheet insulation on the surface of a storage sphere. Only an adhesive is needed

Description: Insulation is a flexible, foamed plastic material in sheet form. It has a closed cellular structure with excellent insulating efficiency and high vapor resistance. Material will withstand temperatures as high as 160°F. It has a K factor of 0.28 at 75°F mean temperature and a water vapor permeability of 0.1 perm (grains-in/sq ft-hr-in Hg). Air transmission at static pressure 10" Hg is less than 0.03 cu ft-in/hr-sq ft.

Insulation will not support combustion, is only slightly affected by solvents, and is unaffected by oils, common corrosive chemicals, or fungus at-

J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA


Engineers
ESTABLISHED 1902
PLANT DESIGN & SURVEYS • CHEMICAL • ELECTROCHEMICAL •
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When inquiring check 2383 opposite last page

for hard-tough-dense concrete repairs . . .

Non-Shrink EMBECO PRE-MIXED MORTAR

Outlasts and outwears plain cement-sand patches because . . .

- *Does not shrink* upon hardening.
- Bonds tightly to old concrete and mortar.
- Tough iron particles serve as reinforcement.
- Density resists water and oil penetration.
- Higher compressive and impact-resistant strength.
- Hard — contains no asphalt.

EMBECO PRE-MIXED MORTAR IS READY TO USE — you add only water.

Used to patch cracks, disintegrated and worn concrete floors, walks, steps, walls, etc.

Write for 4 page folder illustrating many applications.

DIVISION OF AMERICAN-MARIETTA COMPANY

THE MASTER BUILDERS CO.
CLEVELAND 3, OHIO TORONTO 9, ONTARIO

When inquiring check 2384 opposite last page

tack. Ten percent solutions of hydrochloric and sulfuric acids and sodium hydroxide have no adverse effects on Armaflex. Sheets are available in thicknesses of 1/8", 1/4", 1/2", and 3/4"; 30" x 36". (Armaflex sheet insulation is a product of Armstrong Cork Co., Dept. CP, Lancaster, Pa. . . . or for more information check 2385 on form opposite last page.)

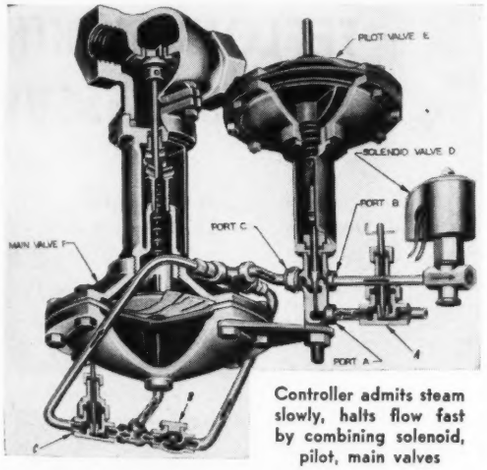
Even modulated steam supply provided by valve trio . . .

unit cycles steam usage to conform to process and equipment requirements

Uses: Control of heat and process steam supply.

Features: Unit provides even, modulated steam supply, no water hammer to delicate equipment, plus a means of cycling steam usage to conform to process and equipment requirements.

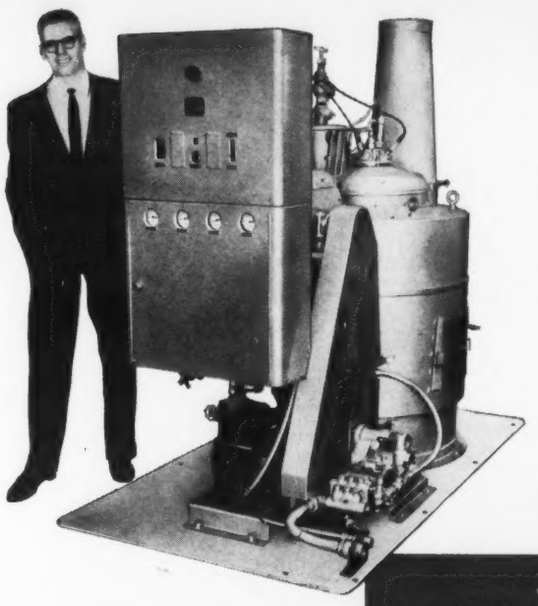
Description: Combination of pilot, solenoid, and main valve function to reduce line pressure to proper value, provide slow opening of main valve for even warmup of heating system, and give fast, positive dead-end of steam flow.



Controller admits steam slowly, halts flow fast by combining solenoid, pilot, main valves

Variable slow opening cycle occurs when solenoid valve (D) is energized by demand thermostat. Ball check valve (B) blocks release of pressure from main valve diaphragm through one side of connecting loop and forces pressure escape through other side at a rate governed by number of turns on graduating valve (C). For closing, full line pressure against main valve diaphragm accomplishes fast, positive dead-end of steam flow in five seconds or less.

(Valvatrol steam control valve is a product of C. E. Squires Co., Dept. CP, 18502 Syracuse Ave., Cleveland 10, Ohio . . . or for more information check 2386 on form opposite last page.)



don't use floor space for your boiler room

VAPOR **MODULATIC**

WATER TUBE BOILER

you can put it on the roof— on a balcony—or hang it from the ceiling

PAY FOR YOUR STEAM THRU FLOOR SPACE SAVER

OVER 13,000 SATISFIED USERS

produces up to 4 h.p. per sq. ft. of area

- Develops up to 27 H.P. per 1000# of weight.
- Produces up to .6 H.P. per cubic ft. of space used.
- Needs only 15" above top of boiler for maintenance. No additional floor space needed.
- Can produce 10% or more above ratings, continuously.
- Full ASME approved.
- It is a complete package unit.
- Proved by 25 years in America's toughest boiler rooms.

Write for complete specifications on the boiler that requires less space and permits lighter floor structure—The Vapor Modulatic.

VAPOR HEATING CORPORATION, 80 E. Jackson Blvd., Chicago 4
Dept. 3-C

Send me Modulatic Bulletin No. 586.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check 2387 opposite last page

See them Now!

Industry's MOST WANTED line of

GENERAL PURPOSE VALVES

FOR PETROLEUM REFINERIES CHEMICAL PLANTS • POWER PLANTS

Write for Supplement No. 1 to Catalog F-9

Address- Dept. 24A-FCP

MOST WANTED — that's right — because the G P line includes gate, globe, and angle type valves having seats faced with **HAYNES STELLITE*** alloy or other hard facing alloys for greater seat-wear resistance . . . at no extra cost!

Hard faced seats, in combination with precision finished, selectively hardened discs and wedges give these valves amazing resistance to erosion, corrosion and galling. That's why they are setting new standards of performance in steam, water, oil, or gas services at the recommended pressures and temperatures.

Get longer, drop-tight, service life with minimum maintenance by specifying Vogt G P Valves. Available in a complete range of sizes from ¼" to 2" and rated 800 pounds at 850°F. and 2000 pounds at 100°F.

HENRY VOGT MACHINE CO.
P. O. Box 1918—Louisville 1, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia, St. Louis, Charleston, W. Va., Cincinnati

Vogt — GENERAL GP PURPOSE — Vogt FOR BETTER VALVES

DROP FORGED STEEL

VALVES

*Trade-Mark of Union Carbide and Carbon Corporation

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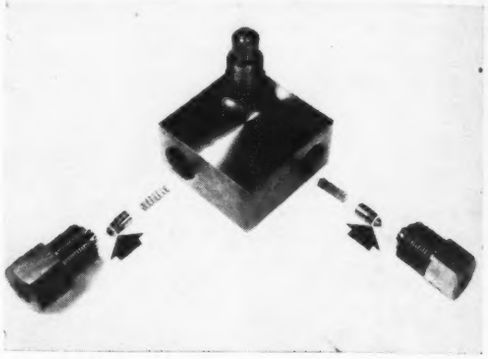


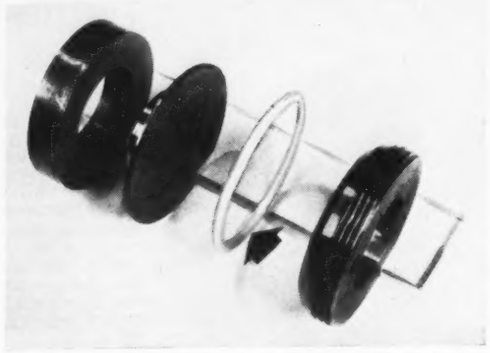
Exploded view of 3¾" poppet valve which operates in pumps handling organic liquids and catalyst solutions at 15,000 psi. Teflon packing rings (arrows) resist chemical attack

Chemical resistance and heat stability of tetrafluoroethylene are used to advantage at Du Pont where . . .

TEFLON PACKING RIN HIGH-PRESSURE CLO

A packing ring of tetrafluoroethylene resin has successfully sealed a 1¼" rupture disc on an autoclave during 110 consecutive experiments at E.I. du Pont de Nemours and Co., Wilmington, Delaware. Conditions ranged from 20" vacuum to 6000 psi pressure, and temperatures alternated from 15 to 200°C. Closure was also used (with shear block replacing rupture disc) in hydrostatic pressure testing of autoclave at 22,500 psi.

Poppet valves, with packing rings of same material, have been performing satisfactorily in pumps operating at 15,000 psi. Chemical resistance of resin has permitted pumping of organic liquids and catalyst solutions which would swell and disintegrate synthetic elastomers customarily used. Packing ring is deformed by stress when it is forced into retaining groove of poppet. Strain is removed by heating completed poppet assembly at 350°C for 30 minutes.



Rupture disc assembly. Same Teflon packing ring (arrow) was used successfully in 110 consecutive experiments on high-pressure autoclave

ING RINGS SEAL URE CLOSURES

Rupture disc assembly as been used through 110 consecutive experiments; from 20" vacuum to 6000 psi

Tetrafluoroethylene resin, Teflon, is inert to almost all chemicals. It is used at temperatures as high as 300°C.

Rupture disc closure assembly consists of a shear block, a rupture disc, a 1¼" diameter packing ring of Teflon, and a beveled retaining ring. Assembly was installed in pressure side of autoclave bottom cover. Initial seal was made by torque applied with one-hand pressure on a six-inch spanner wrench. When internal pressure in autoclave was increased, assembly became self-sealing.

Because of self-sealing principle of internally located, chemical- and heat-resistant, circular cross-section packing ring of Teflon, it is feasible to seal rupture discs of any diameter.

(Tetrafluoroethylene resin is a product of E.I. du Pont de Nemours & Co., Dept. CP, Wilmington 98, Del. . . . or for more information check 2389 on form opposite last page.)

Loren Farris
PERSONNEL DIRECTOR
Detroit Division
Chicago Rawhide Manufacturing Co.

"Look! It soaks up grease just like a sponge."

LAN-O-KLEEN removes 95% of all dirt and grime encountered in industry.
Easily — and safely!

LAN-O-KLEEN helps to protect the skin as it cleans. WEST — in pioneering the development of "double action" industrial cleaners — was the first to impregnate beneficial amounts of free lanolin into a corn meal type hand cleaner.

LAN-O-KLEEN is economical to use. It bulks greater than most other hand cleaners — therefore goes farther per pound. Too, the sturdy LAN-O-KLEEN dispenser rations just the right amount to do a quick, thorough cleansing job.

"We know of no safer hand cleaner than Lan-O-Kleen"

"We've always been interested in preventing dermatitis. This is why we've supplied our plant employees with Lan-O-Kleen for the past ten years. Its free lanolin and soft cleansing action help prevent skin irritations, yet quickly remove dirt, grease and grime," says LOREN FARRIS, Personnel Director, Detroit Division of Chicago Rawhide Manufacturing Company.

"Several of our departments have also used West Antiseptic Protective Hand Creams for a number of years. We know these aids to comfort and safety help keep our workers on the job at maximum efficiency."

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Avenue, Montreal

☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

Name.....

Position.....

Mail this coupon with your letterhead to Dept. 24

When inquiring check 2390 opposite last page

New QUAKER hose for hot air ducting cuts heat loss up to 57%

OUTSIDE JACKET SURFACE TEMPERATURE (DOUBLE JACKET) 170°F.
OUTSIDE JACKET SURFACE TEMPERATURE (SINGLE JACKET) 235°F.
INSIDE AIR TEMPERATURE 450°F.

Synthetic fabric jacket and silicone tube retain temperatures from upstream to downstream end

Made in continuous lengths up to 50′, this new Quaker hose easily withstands temperatures as high as +450°F; as low as −80°F.

As the above diagram shows, the hose keeps heat loss—and therefore energy loss—to a minimum. (Comparable outside temperature of ordinary hot air ducting material, such as stainless steel, would be about 400° F.). Both the silicone tube and the synthetic fabric jacket of Quaker's new hose hold the heat!

Other advantages? The hose is lightweight and fully flexible. And it resists abrasion.

Available in either single or double jacket, the hose comes in 1″ to 4″ I.D.'s. Sizes 1″ and 1¼″ I.D. can be made in 30′ continuous lengths; 1½″ to 4″ I.D. in 50′ lengths. The hose takes regular expansion and shank hose couplings.

Want more information? Write to: *H. K. Porter Company, Inc. Quaker Rubber Division, Philadelphia 24, Pa. or Quaker Pioneer Rubber Division, Pittsburg, Cal.*

HKP QUAKER RUBBER DIVISION
QUAKER PIONEER RUBBER DIVISION
H. K. PORTER COMPANY, INC.

When inquiring check 2391 opposite last page

Release speed lower than pick up speed on clutch . . .

differential of 400-500 rpm

Uses: As a power transmission device for use with gasoline and diesel engines in 10-50 hp range.

Features: Clutch has a disengagement speed approximately 400-500 rpm lower than engagement speed. Wide differential allows engine to idle at a satisfactory speed without slippage at relatively low operating speeds.

Description: Clutch has extra large friction area and simplified construction. It will handle a greater load in proportion to its own weight than standard centrifugal clutches. Units accommodate a standard V-belt Load disengagement speed is provided by an exclusive "lock-in" toggle action.

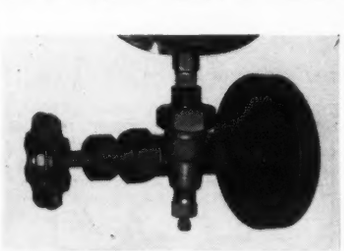
(Tog-O-Loc Clutch is a product of Salsbury Corporation, Dept. CP, 1161 E. Florence Avenue, Los Angeles 1, Calif. Check 2392 opposite last page.)

Fewer fittings needed on combination valve for piping . . .

acts as check and drain valve and test gage connection

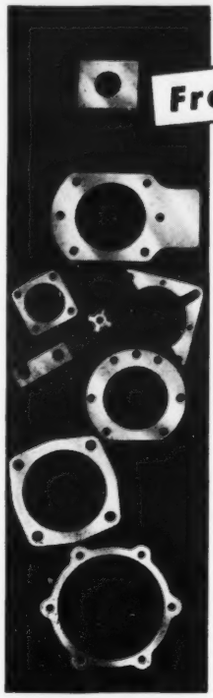
Uses: Valve is designed for instrument piping and general use where reduction of the number of threaded connections is wanted.

Features: Unit combines unions, nipples, reducers, elbows,



Valve has double-seating stem for repacking under pressure

GASKETS · SHIMS WASHERS



From 1 to 1 Million

No matter what type, thickness, shape or quantity required, you can count on Chicago-Wilcox for uniformly accurate gaskets, shims, washers or special stampings.

With 50 years accumulation of dies, chances are we can furnish just what you need without a die charge—thus reducing costs substantially and assuring on-schedule delivery.

Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . . and in quantities to meet your production requirements.

Write for catalog and submit your specifications for quotation.

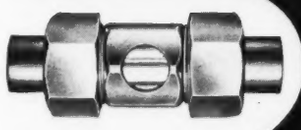
CHICAGO-WILCOX MFG. CO.
7717 South Avalon, Chicago 19, Illinois

When inquiring check 2393 opposite last page

NEW! "250" SERIES LIQUID EYE®

POSITIVE SEALING INDICATORS

designed to save you even more time and money



6 sizes now available: 3/8″, 1/2″, 5/8″, 7/8″, 1 1/8″ and 1 3/8″ O.D.S.

The new "250" has all the proved Liquid Eye advantages *plus* these newly engineered features:

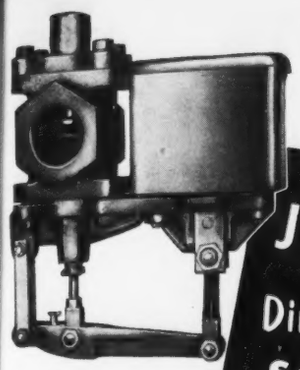
- **smaller—more compact, simplified design.**
- **preformed copper extension eliminates need for separate gaskets—foolproof installation.**
- **complete, self-contained, economy unit.**

Ask your wholesaler now.

Write today for catalog covering the complete Allin line.

Allin ALLIN MANUFACTURING CO.
410 N. Hermitage Ave. • Chicago 22, Illinois
Over 1,000,000 Liquid Eyes Sold to Date!

When inquiring check 2394 opposite last page



OUTSTANDING FOR STEAM SERVICE

JOHNSON Direct Operated SOLENOID VALVES

Stainless steel valve and seat. Sizes: ½" to 3". Write for facts.

Job after job, these Johnson Direct Acting Solenoid Valves are proving an ideal answer for service on steam lines. Their design removes the solenoid proper from the heat of the line, permits a leverage system with ample power to open against differential pressures up to 150 lbs. There are no pilot valves or auxiliary pistons, and construction is really heavy duty throughout. You will find their inherent simplicity and instant response will solve a lot of operating problems like no other valve can.

THE JOHNSON CORPORATION
826 Wood St., Three Rivers, Mich.

When inquiring check 2395 opposite last page

GRATING
FOR EVERY PART OF YOUR PLANT

Tri-Forged Grating is made by forge welding triangular shaped cross bars to the bearing bars, thus forming a solid surface of one-piece construction.

Tri-Lok Grating is fabricated by forcing cross bars into alternating "J" slots in bearing bars. Triple-twist and turn lock assures long-lasting construction.

Readily available through Dravo Sales Offices and Distributors. For complete information, write to Dept. D-2703, Dravo Corporation, Machinery Division, Fifth and Liberty Avenues, Pittsburgh 22, Pa.

DRAVO
CORPORATION

When inquiring check 2396 opposite last page

tees, valve, and drain valve into one space-saving unit. It acts as a check valve and has a test gage connection.

Description: Device is an offset valve with a vertical rising ball check on downstream side of the seat and a solid shank connection to vessel. Double-seating stem permits repacking under pressure. Seats are regrindable and renewable. Gages are fitted to a union connection.

(Jerguson No. 66U-VG Valve is a product of Jerguson Gage & Valve Co., Dept. CP, 80 Fellsway St., Somerville 45, Mass. . . . or for more information check 2397 on form which is located opposite last page.)

Coating prevents sticking of clay, lime, or dirt to equipment . . .

compound will not harm surfaces, leaves no stain

Uses: Coating will form a thin, non-stick film on equipment where clinging of material is a problem.

Features: Dry film resists sticking of concrete, clay, moist dirt, coal, lime, and other materials. It is non-toxic and will not harm surfaces. It leaves no oil stain.

Description: Product contains a rust preventative additive. It is soluble in petroleum solvents or cleaning naphtha. It can be used on concrete, conveyor belting, truck beds, or food processing equipment where its non-toxic properties reduce contamination. Coating may be sprayed, brushed, or wiped on. It dries quickly to form a thin, waxy coating that polishes to a high luster. It is thixotropic in nature, will not run or sag, and can be applied to wet surfaces.

(Powerfilm MRC is a product of The Thomas Company, Dept. CP, 1645 Hennepin Ave., Minneapolis 3, Minn. . . . or for more information check 2398 on form opposite last page.)

W-S Forged Steel Fittings

Now protected with...

new rustproof coating

That attractive color you see on our forged carbon steel fittings is a new synthetic coating that effectively protects the fittings against corrosion in stock and in service. The coating completely covers the fittings—inside and outside, thus protecting threads and sockets, as well as external surfaces.

If you are going to paint your piping system for color coding or other reasons, the new coating serves as an excellent base for paint. No objectionable rust or scale to scour off before painting.

All W-S forged carbon steel fittings, in both screw-end and socket-welding types, are now available with the new blue rustproof coating.

Remember the blue color. It labels the fitting a W-S Quality Product.

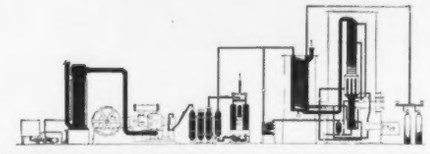
Send for your copy of Forged Steel Fittings Catalog A-3-56

Write to W-S Fittings Division, H. K. Porter Company, Inc., P.O. Box 95, Roselle, N. J.

HKP W-S FITTINGS DIVISION
H. K. PORTER COMPANY, INC.

When inquiring check 2399 opposite last page

Make Oxygen . . . . .



SUPAIRCO plants produce gaseous or liquid oxygen, gaseous or liquid nitrogen, acetylene, liquid air

Do you have our lastest catalog?

New catalog describes single and double rectification plants and lists production data, shows flow charts and plant layouts. Single rectification type plants range in size from 300 to 600 cu. ft. per hour capacity, and double rectification type from 900 to 12,000 cu. ft. per hour. Large liquid oxygen plants are available in capacities to 12 tons a day.

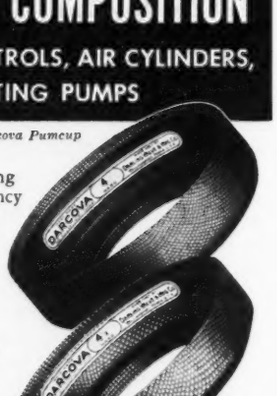
Free catalog on request

SUPERIOR AIR PRODUCTS CO.
132 MALVERN STREET • NEWARK 5, NEW JERSEY • U.S.A.
Manufacturers of production and storage equipment for gaseous or liquid oxygen, nitrogen, air, hydrogen and helium

When inquiring check 2400 opposite last page

DARCOVA PUMCUPS
now available with
100% NYLON COMPOSITION
for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup



Darcova 45° Bevel Type Pumcup

DARCOVA PUMCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

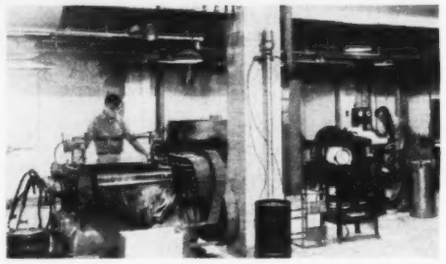
Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA — THE ORIGINAL COMPRESSION CUP
TRADE MARK
PUMCUPS

When inquiring check 2401 opposite last page



Insulation all around

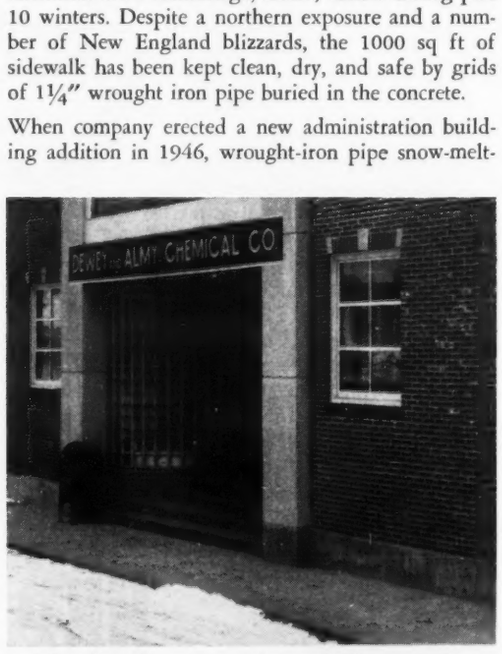
Walls, ceiling, and floor of testing room in research and quality control laboratories of newly completed Ditto plant are insulated with five inches of Foamglas. Relative humidity ranges up to 100% and insulation must retain its efficiency despite constant exposure to moisture. Overall insulation makes possible precise regulation of temperature and humidity conditions. (Foamglas is a product of Pittsburgh Corning Corp., Dept. CP, Pittsburgh, Pa. . . . or check 2402.)

Ten years service proves worth of snow-melting system . . .

wrought-iron grids buried in concrete in 1946 keep sidewalk clean, dry, and safe

Clean and dry! That has been the condition of 150 feet of sidewalk along front of Dewey and Almy Chemical Co.'s Cambridge, Mass., offices during past 10 winters. Despite a northern exposure and a number of New England blizzards, the 1000 sq ft of sidewalk has been kept clean, dry, and safe by grids of 1¼" wrought iron pipe buried in the concrete.

When company erected a new administration building addition in 1946, wrought-iron pipe snow-melt-



Sidewalk is always clear and clean thanks to wrought-iron snow-melting system buried in the concrete

New! LEIMAN
Air-cooled
HIGH VACUUM PUMP

VACUUMS
24 to 29.9" Hg.

CAPACITY
15 to 40.8 c. f. m.

Air-Cooled pump operates 24 hours a day at 140°F.

This air-cooled Leiman Rotary Positive High Vacuum Pump gives you greater capacity in a smaller pump—a compact pump unit that can be placed anywhere. It incorporates the Leiman 2-wing rotary pump, with steel blades, cast iron cylinders and patented automatic wing adjuster which assures leak-proof seal for years and years. Put one on test.

Write for detailed folder and prices.

LEIMAN BROS., INC.
220 Christie St., Newark 5, N. J.

FEATURES
- Radiator-cooled lubricating system circulates pre-cooled oil through pump
- Eliminates vapor
- Eliminates water-cooling-piping—leakage
- Can not overheat
- Saves floor space 30" long—27" high—21" wide

Other Leiman Air Pumps:
Vacuums to 29.9" Hg.
Pressures to 20 psig.
Capacities to 162 c.f.m.
Get complete catalog.

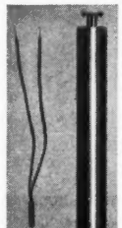
When inquiring check 2403 opposite last page

ON THE SPOT HEAT
to your exacting requirements!

TRENT STRIP HEATERS

for Ovens, Dryers, Kettles, Process Equipment
- Flat Metallic Tube Casing
- Ceramic Block Terminal Blocks
- No Grooves—No Heat Distortion
- Sealed End Construction

Available in a complete range of types and sizes, wattage requirements, and voltage conditions—for maximum safe surface temperatures of 750°F. and 1000°F!



TRENT CARTRIDGE HEATERS

for Dies, Molds, Platens, Sealers, Defrosting
- Brass or Steel Sheath Construction
- Silver Soldered End Opposite Terminals
- Moisture and Wax Resistant
- Nickel Chromium Heater Coil Sealed in Ceramic Insulation
- Brass Angle, Pigtail, Rod, or Stud Type Terminals

Standard sizes from ⅜" to 1¾" diameter, and 1½" to 22" in length, are supplied in a range of wattage requirements for 110 and 220 volt operation.

Discuss your spot heating requirements with a Trent representative.

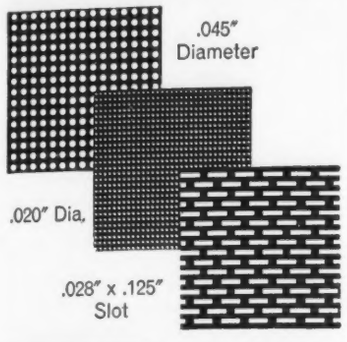
Trent Representatives in Principal Cities Coast to Coast

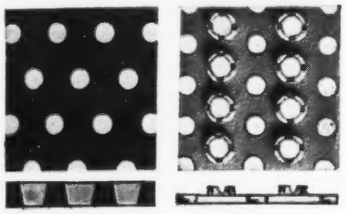
TREN INC
Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.
In Canada: Supreme Power Supplies Limited, Toronto

When inquiring check 2404 opposite last page

H & K Perforated Screens

CORROSION RESISTANT
MADE FOR LONG LIFE





Tapered Round Holes In Steel

Round Holes Special Burred

We are well-experienced in the perforating of screens in stainless steels, monel metal and other alloys.

Screens can be cut to shape or size with margins or unperforated areas as required. Perforated screens can be furnished in practically any material from foil thin to 1″ thick.

Contact either H & K office or one of our agents. We will be glad to work with you on your perforated screen requirements.

FILL IN AND MAIL COUPON TO OFFICE AND WAREHOUSE NEAREST TO YOU.

FIND NEAREST H & K AGENT IN THE 'Yellow Pages'

Listed Under "Perforated Metals"

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5636 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
110 Liberty Street
New York, N.Y.

Please send me—

☐ GENERAL CATALOG NO. 62

☐ STOCK LIST of Perforated Steel Sheets

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

When inquiring check 2405 opposite last page

ing system was installed. Oil-fired heating boilers provide heat for system which otherwise would have been wasted. Waste steam from building heating system return line is piped to an exchanger. Here it transfers its heat to about 180 gallons of a permanent antifreeze solution. This solution, at 160°F, is pumped through grids.

(Wrought iron pipe for snow-melting system was supplied by A.M. Byers Co., Dept. CP, Clark Bldg., Pittsburgh 22, Pa. . . . or for more information check 2406 on form opposite last page.)

Push-button lubrication systems and applications explained

Systems for providing automatic, centralized lubrication on bearing surfaces are covered in eight-page bulletin. Illustrations show typical installations of air-operated, vacuum-operated, and manually-operated systems. Various kinds of pumping units, alarm devices, and central pump-priming systems are also illustrated and described.

Bul 811 is issued by Lincoln Engineering Company, Division of McNeil Machine & Engineering Co., Dept. CP, 5799 Natural Bridge Ave., St. Louis 20, Mo. When inquiring specify 2407 on form opposite last page.

"Sorry, sir . . . but we were told to color-code ALL *pipes in the plant."*

Thanks to Philip A. Untersee for this cartoon idea. He's employed by E. I. du Pont de Nemours & Co., Inc., at Belle, W. Va.

Add flexibility to your machines with low-cost speed control

Choose from 8 sizes . . . ¼ to 15 hp . . . 1.75:1 to 4:1 speed ratio. Converts any standard constant-speed motor into variable speed drive.
MAXIMUM TO MINIMUM OUTPUT SPEED POSITIONS

REEVES®

Vari-Speed Motor Pulley

Get greater productivity . . . run at the most economical production speed . . . handle production or process variables with the same machine—install low-cost REEVES Vari-Speed Motor Pulleys!

Change machine output speeds . . . instantly and accurately . . . without interrupting production. Positive "close-grooving" lubrication assures free sliding discs for *easy, sure* speed adjustment. Minimum parts mean long, trouble-free service.

Write today—CP29-V545; we'll send your copy of the Motor Pulley bulletin complete with rating data and dimensions.

REEVES PULLEY COMPANY

Division of RELIANCE ELECTRIC AND ENGINEERING CO.

Columbus, Indiana

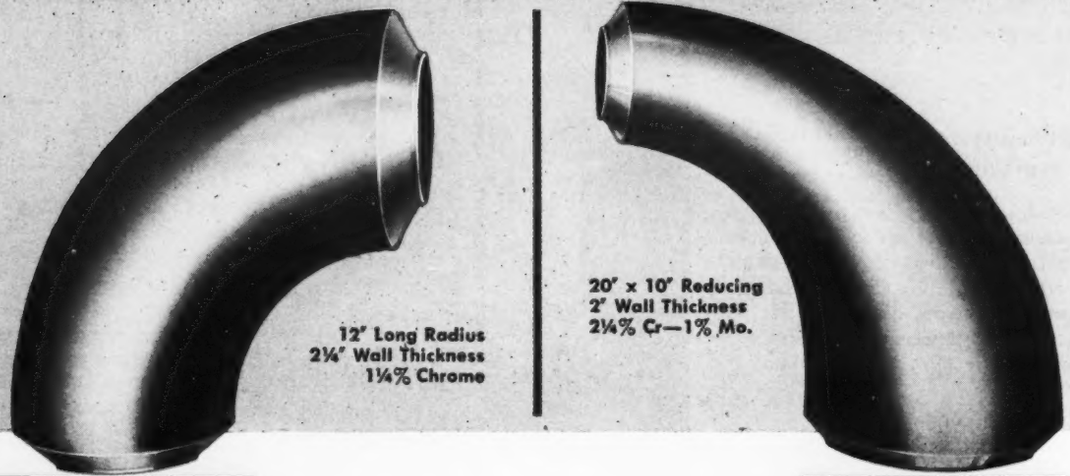
When inquiring check 2408 opposite last page

LARGER SIZE RANGE

MIDWEST ELBOWS

IMPROVED DELIVERY

HEAVY WALL CARBON STEEL AND ALLOY



STRAIGHT LONG RADIUS 90° ELLS

Nominal Pipe Size	Maximum Wall Thickness
36	1.250
30	2.000
26	2.000
24	1.500
20	1.375
18	2.250
16	2.125
14	1.750
12	2.000
10	2.000
8	1.750
6	1.000
5	.625
4	.750
3	.625
2½	.375
2	.500

These straight elbows can be furnished with LONG TANGENTS at no extra cost. All thicknesses less than those shown above are, of course, available.

The exclusive Midwest method of making all welding elbows from plate instead of tubing gives us a FLEXIBILITY OF MANUFACTURE that is much greater than by any other process. These heavy wall Midwest straight and reducing elbows are available in any material that can be secured as plate. The maximum wall thicknesses for which we now have equipment are indicated by the tables at left and right. And, because it is easier to get plate than tubing, better delivery is another advantage. Still another is the close tolerances inherent in our process.

Quality control goes beyond all code requirements. The longitudinal weld of every heavy wall elbow is completely X-rayed as standard procedure in our method of manufacture.

You will find it to your advantage to send us your inquiries.

REDUCING LONG RADIUS 90° ELLS

Nominal Pipe Size	Maximum Wall Thickness
30	2.000
26	*
24	2.000
20	2.000
18	2.000
16	1.500
14	1.750
12	2.250
10	2.000
8	1.750
6	1.000
5	.625
4	.750
3	.625
2½	.375
2	.500

Reductions to all nominal pipe sizes down to ½ large diameter. All thicknesses less than those shown above are, of course, available.
*Refer to factory.

MIDWEST PIPING COMPANY, INC.

Main Office: 1450 South Second St., St. Louis 4, Mo. • Plants: St. Louis, Clifton, N. J. and Los Angeles

Sales Offices

ASHEVILLE (BOX 446, SKYLAND, N.C.) · BOSTON 27—436 FIRST ST. · CHICAGO 3—79 WEST MONROE ST. · CLEVELAND 14—616 ST. CLAIR AVE. · HOUSTON 2—1213 CAPITOL AVE. · LOS ANGELES 33—520 ANDERSON ST. · MIAMI 34—2103 LE JEUNE RD. · NEW YORK 7—50 CHURCH ST. · ONEIDA, N.Y.—282 NORTH MAIN ST. · SAN FRANCISCO 11—420 MARKET ST.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

7475

Gives weight-load tables for pipe hangers

Complete specifications for manufacturer's counterpoise pipe hangers are given in 16-page brochure. Engineering drawings of all models, weight-load selection tables, and erection and adjustment information are included. How units provide constant load support for piping systems subject to vertical movement is explained.

Bul 156 is available from National Valve and Manufacturing Co., Dept. CP, 3100 Liberty Ave., Pittsburgh 1, Pa. Specify 2409 opposite last page.

Built-in steel strainer prevents clogging of steam trap . . .

vertical screen may be removed quickly and easily

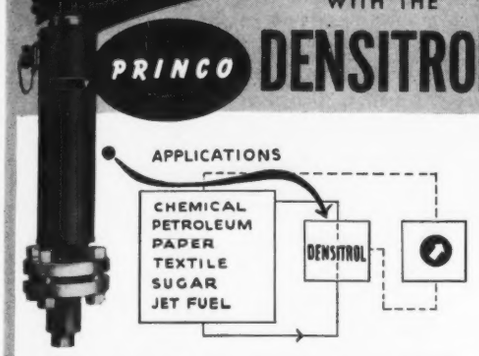
Uses: For removing condensed moisture or water from steam piping systems.

Features: Steam trap has built-in stainless steel strainer located on inlet side. Strainer catches foreign matter, prevents clogging, and reduces cleaning maintenance time. Installed vertically, screen is easily and quickly removed for cleaning.

Built-in strainer catches foreign matter before it can clog

For more information on product at left, specify 2410 . . . see information request blank opposite last page.

GET automatic LIQUID DENSITY CONTROL WITH THE PRINCO DENSITROL



The DENSITROL is an extremely accurate, sensitive instrument for continuously, accurately and automatically controlling or recording the blending, mixing, separation, dilution or concentration of industrial process liquids. It quickly pays for itself because it eliminates operator attendance and does on a continuous basis what formerly was done on a batch basis.

For ranges, calibrations and other specifications, write, wire or call.

PRECISION THERMOMETER & INSTRUMENT CO.
1434 BRANDYWINE STREET • DEPT. CP. • PHILA. 30, PA. • RI 6-6671

When inquiring check 2411 opposite last page

to give you better
SPRAY NOZZLES

• Shown above is a portion of Spraying Systems' own research facilities. Here the variables of nozzle design, fluid properties and operating conditions are studied and measured . . . to provide original data for better design and improved performance wherever spraying is involved.

WRITE FOR Catalog 24 . . . contains forty-eight pages of complete information on thousands of nozzle types and capacities.

SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET • BELLWOOD, ILL.

ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

When inquiring check 2412 opposite last page

Description: Trap has durable semi-steel body and all stainless steel working parts. Space is saved because strainer is integral part of trap. Inlet and outlet tapped hole sizes are ½ and ¾". Units are suitable for working pressures up to 150 psig.

(Strong 140-S traps are product of Strong, Carlisle & Hammond Co., Dept. CP, 1392 West Third St., Cleveland 13, Ohio . . . or for more information check 2413 on form which is located opposite last page.)

No distortion of tubing with full-range cutter

Uses: For cutting copper, aluminum, brass, and plastic tube.

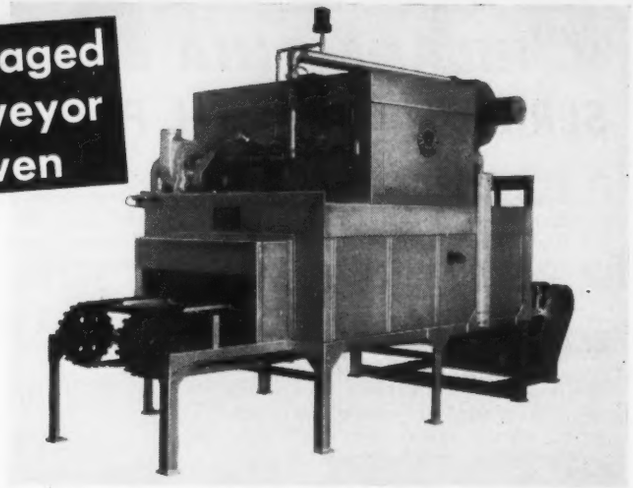
Features: Designed to provide from ⅛ to 3⅛" capacity — reported to be first cutter to achieve this full range. Unit cuts straight and smooth without distorting tube out of round.

Cutter gives smooth, even cuts on all tube without distortion

Description: Hook and arm of tube cutter are cast malleable, polished, and satin chrome plated. Standard cutter wheels are easily and quickly changed. Cutter weighs 2 lb-9 oz, and can be carried in shirt pocket.

(Tube cutter is product of The Erie Tool Works, Dept. CP, Liberty & 12th Sts., Erie, Pa. . . . or for more information check 2414 on form which is located opposite last page.)

Packaged Conveyor Oven for



Continuous Uniform Drying • Baking • Curing

Rockwell-designed and factory-assembled belt conveyor oven, ready for quick installation and controlled recirculation heating. Gas, electric or steam heated for any desired production rate. Write for Catalog.

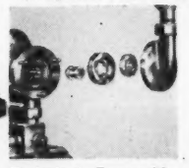
W. S. ROCKWELL COMPANY
FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY
2207 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

When inquiring check 2415 opposite last page

NEW!
GAULIN RE* COLLOID MILL

This is the Model 2A, shown with accessory equipment — stainless steel 3-way valve, by-pass tubing and tank — for processing quantities as small as 8 oz.

The Special PLUS Features of the Gaulin RE*



Exclusive! Removable rotor, stator and shaft seal can be disassembled without tools. Shaft leakage is eliminated.

Special micrometer adjustment, from .001 to .040, positions gap opening between rotor and stator. Adjustment made when running or not.

Here's a brand new concept in Colloid Mills — the Gaulin RE* with removable rotor, stator and shaft seal. The horizontal two-stage design gives maximum capacity per horsepower and unusual processing efficiency.

Special Materials Available
Rotor and stator can be furnished in stainless steel, tungsten carbide, ceramic, alundum and other special materials. Parts are interchangeable.

Wide Range of Capacities
The Gaulin RE* has a capacity range from 0-2600 gph. Model 2A: 0-310 gph; Model 4A: 0-1000 gph; and Model 8A: 0-2,600 — all depending on product, specifications and gap setting.

Send for New Bulletin
Put this new Colloid Mill to work for you! Complete data on the RE* line is available in a special bulletin. Ask for C-56 from: The Manton-Gaulin Mfg. Co., Inc., 55 Garden St., Everett 49, Mass.

Gaulin MANTON Gaulin

*patent applied for

MANTON-GAULIN MFG. CO., INC.
Everett, Massachusetts

When inquiring check 2416 opposite last page

PHILADELPHIA PUMPS
SERIES HP • HIGH PRESSURE

Advanced Designs—for economy, safety and performance—demanded by modern high pressure processing techniques. Examples: flow-blending chemicals and inhibitors, pulsing liquid extraction of metals, pumping liquid gases, metering D_2O to homogeneous reactors, charging pressurized-water atomic power systems, etc.

CATALOG HP-1254 describes these *advanced designs.*

PHILADELPHIA PUMP & MACHINERY COMPANY
13500 Philmont Avenue, Philadelphia 16, Pa.
SUBSIDIARY, AMERICAN METER COMPANY

When inquiring check 2417 opposite last page

Describes motors for chemical plants

Construction features of totally-enclosed, fan-cooled and explosion-proof motors of 1 to 100 hp are described in six-page bulletin. Special features for chemical applications are pointed out. Cut-away diagrams of motors, along with installation photographs, show construction and uses.

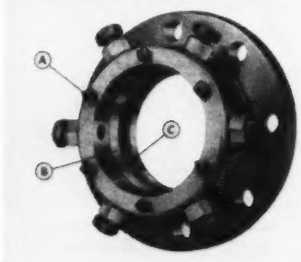
Bul 51B8477 is issued by Allis-Chalmers Manufacturing Company, Dept. CP, 1151 S. 70th St., Milwaukee, Wis. When inquiring specify 2418 on form opposite last page.

Seals off pipe ends or flanges quickly, efficiently . . .

unit can be bolted in place or welded permanently

Uses: Pipe fitting seals off end of pipes, can seal off and mate up with standard flange facings, or be used with blind-plate flanges.

Features: No flange spreaders, jacks, or bars are required. No threading or grooving of pipe



Thrust screws (A) move thrust ring (B) forward to squeeze packing ring (C) against pipe wall

ends is necessary. Just cut pipe, slide on fitting, tighten . . . result is an effective seal that withstands several hundred pounds per square inch pressure. It can be bolted into place for future removal or welded permanently.

Description: Fitting consists of thrust screws, thrust ring, clamping screws, and body. It can

Cut costs—Eliminate messy, sticky, leaky, ball pots, fountain brushes and rollers . . .

SPRAY
YOUR STENCILS WITH
REYNOLDS
QUICK DRYING, WATERPROOF
STENCIL INKS

Handy aerosol spray container is always ready to use. Nothing to load. No spilling. No brushes to clean. No drying out. Covers quickly. Saves time. Very economical.

9 COLORS. For stenciling cartons, crates, boxes, steel drums, color coding metals and other materials, or any other stenciling on steel, wood, fiber, canvas, glass or other surfaces.

A trial will convince you. *Write for full details!*

Ask us also about Reynolds Stencil Kover, the very opaque, fast covering blockout fluid. Tan colored to match corrugated cartons. Completely blocks out old stenciling, labels, printing, crayon or painted markings, etc. Dries quickly. Permits re-marking and re-shipment in original carton; —re-stenciling of left over cartons;—or correcting stenciling errors. Packaged in a handy 12 oz. aerosol container.

REYNOLDS INK, INC.
4516 Euclid Avenue • Cleveland 3, Ohio

When inquiring check 2419 opposite last page

Now! Make 90° bends in 3" pipe in one pass

It's Easy—with the New BLACKHAWK FEATHERWEIGHT hydraulic pipe bender!

Now you can make factory-like bends with ease using BLACKHAWK's super-portable 103-pound ALUMINUM BENDER. Features easy-on easy-off Top Plate — "Optik-Angle" bend gauge — 13-inch stroke ram. Users report Blackhawks with electric-powered hydraulic pump pay for themselves in only 35 bends — save up to 75% over cost of manufactured ells. See your supply house now for this Blackhawk featherweight and for other Porto-Power kits to bend ½" to 2" thin wall conduit and 1" to 4" rigid pipe. Only 3 quick settings needed for 3½ and 4" bends!

BLACKHAWK
BLACKHAWK MFG. CO., Dept. P-6837 Milwaukee 46, Wis.

When inquiring check 2420 opposite last page

ACCURATE EASY READING
MANOMETERS

For precise reading as well as for accurate measurements choose Trimount Manometers.

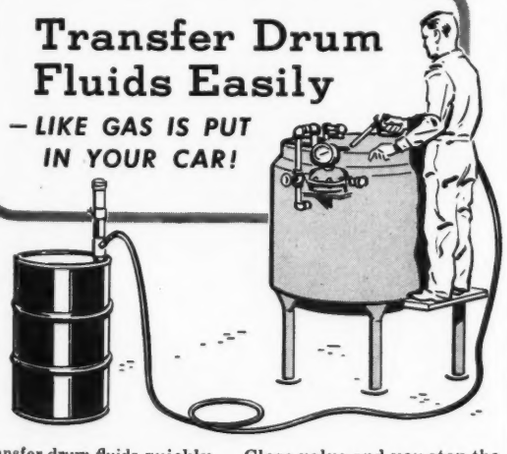
Sturdy construction—long lasting—used for many purposes—Multiple Tube, Well Type, U Tube, etc. Also custom made to your specifications.

Write for Illustrated Bulletin C

Trimount INSTRUMENT CO.
3119 WEST LAKE STREET • CHICAGO 12, ILLINOIS

When inquiring check 2421 opposite last page

Transfer Drum Fluids Easily
— LIKE GAS IS PUT IN YOUR CAR!



Transfer drum fluids quickly, direct from original 55 gallon drums! It's simple with Graco's lightweight, air-powered Fast-Flo that pumps up to 23 gallons per minute. *Here's how:*

Mount the Fast-Flo in the drum, attach a ¾" hose and gasoline type valve. Open valve at end of hose to start the pump.

Close valve and you stop the pump. One-man operation!

No danger in hazardous locations, no motor burn-outs or sparking. Cuts down on spillage too—helps plant housekeeping. Write for Fast-Flo booklet. See how this lightweight pump solves transferring and dispensing operations.

GRACO *Fast-Flo* "DIRECT-FROM-DRUM" PUMPS
GRAY COMPANY, INC. • *Engineers and Manufacturers*
32 Graco Square, Minneapolis 13, Minnesota
FACTORY BRANCHES: New York (Long Island City) • Philadelphia • Detroit Chicago • Atlanta • Houston • San Francisco
SEE YOUR LOCAL INDUSTRIAL DISTRIBUTOR

When inquiring check 2422 opposite last page

be used a number of times and fits easily into tight places. Sizes are available in 2" through 12" with 150-pound ASA standard steel flanges.

(Plidco-Flange is a product of The Pipe Line Development Co., Dept. CP, 5700 Detroit Avenue, Cleveland 2, Ohio. Check 2423 opposite last page.)

Large discharge capacity gives faster warmup in steam trap . . .

at 250 psi, ½" unit discharges 3500 lb/hr

Uses: For low-pressure, high-condensate rate applications where a smaller and inexpensive trapping unit is needed.

Features: Extra large orifice in steam trap allows high discharge capacities. At 250 psi a ½" unit will discharge 3500 lb/hr. Traps 1½ to 2" discharge 55,000 lb/hr. Warmup is faster.

Description: Unit's valve arrangement automatically compensates for differential pressures through a range of 0 to 250 psi. Units operate through fluctuating steam pressures and variable condensate rates within capacity range without changing orifice size or bucket weights. Positive seating of valve prevents wire draw and loss of steam. Trap is manufactured in pipe sizes from ½ to 2".

(Unitrap Steam Trap is a product of Perfecting Service Company, Dept. CP, 332 Atando Ave., Charlotte 6, N.C. . . . or check 2424 opposite last page.)

By-pass rotameter system

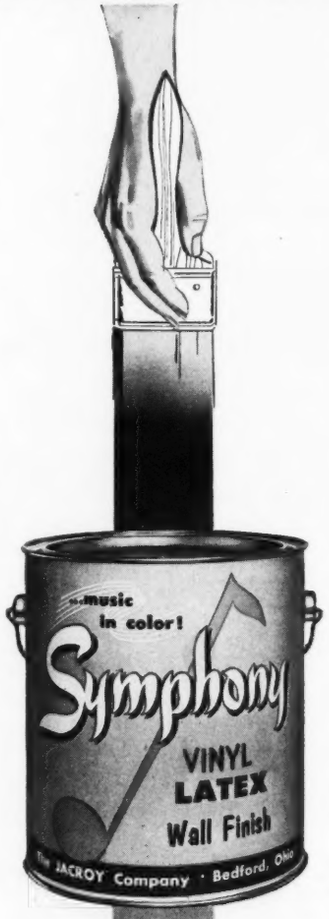
Low-cost method of using rotameters to measure flow rate in pipe sizes of two inches and above is explained in two-page engineering bulletin.

Bul 116 is available from Brooks Rotameter Co., Dept. CP, Lansdale, Pa. Specify 2425 opposite last page.

George Meckler, President
The Jacroy Company

"Formulating Symphony Brand Paints with Colton *FLEXBOND 800* has enabled us to give our customers a better paint for less money,"

says George Meckler, President
The Jacroy Company



Paints designed for the popular-price market are specialties of The Jacroy Co., Bedford, Ohio, and Jacroy Canada, Ltd. As the result of being formulated with Flexbond 800, Jacroy's Symphony Brand Paints now enjoy increased sales . . . with customers coming back for more.

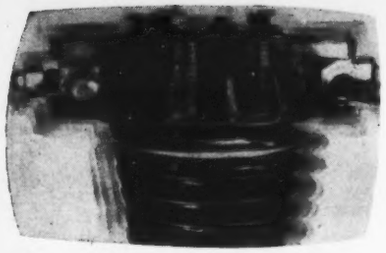
Flexbond 800, finest of Copolymer Acetate Emulsions, adds the built-in features of quality paints—outstanding film integrity, scrub resistance, sheen uniformity, easy brushing and package stability—at minimum cost.

Colton representatives will be happy to go over with you the Daniel-Litter Laboratories report showing the superiority of Colton Flexbond 800 and to demonstrate the advantages of Flexbond 800 in your present paint formulations.

Write Dept. A 2

COLTON COLTON CHEMICAL COMPANY
A Division of Air Reduction Company, Inc. • 1747 Chester Avenue, Cleveland 14, Ohio
Sales Offices and Warehouse Facilities Throughout U. S.
EXPORT: Airco Company International, New York 17, N. Y.

When inquiring check 2426 opposite last page



VIBRATION DOES NOT CRACK OR FISSURE THE PLASTIC SEAL

for those hard-to-hold liquids and gases

Leak Lock is a truly remarkable joint sealer, as its plastic base holds chemical solutions and gases that quickly penetrate ordinary sealers.

Leak Lock adheres firmly to most surfaces . steel, iron, copper, aluminum, cork, asbestos, plastics, etc., and stays flexible indefinitely. It is the real answer to those difficult leaking joint problems. Stewart Industries, Inc., 16 Colfax Ave., Clifton, N. J.

Send for FREE SAMPLE for test purposes

Leak Lock

When inquiring check 2427 opposite last page

Easy TO OBTAIN SURFACE TEMPERATURES UP TO 1000°F with PANDUX® SURFACE TEMPERATURE THERMOMETERS

PANDUX® Spot-Chek Thermometer

ALL STAINLESS STEEL 50° F. to 1000° F. Easy to read—fast—compact. Accuracy to ± 2% for all surface temperatures such as dies, hot plates, etc. Also for ovens and other enclosed spaces. User can reset, if necessary. Diameter 1¾", weight ⅓ oz. Model 573-M with magnet clamp, price $4.00.

PANDUX Hi-Heat

Designed for fast, accurate check of all hot surfaces from 50° F. to 750° F., for hot plates, platens, dies, molds, ovens, furnaces — either flat or rounded surfaces. Thermometer is affixed by two Alnico magnets. Highly practical in a wide variety of industrial applications — sells for $6.75.

PANDUX Surface Thermometer

Standard with industry for easy measurement of surface temperature, compact, low cost, accurate ± 2° over entire range. Three ranges: −50° F. to 250° F., 0° F. to 300° F., 70° F. to 370° F. Also in Centigrade. Price $6.75.

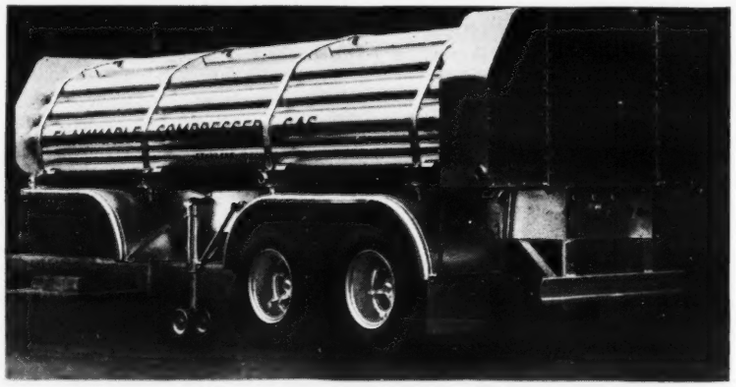
ALSO PANDUX PIPE THERMOMETERS

Your order will be filled through your nearest dealer. Write Dept CP-37

PACIFIC TRANSDUCER CORP.
11836 West Pico Blvd. — Los Angeles 64, California

When inquiring check 2428 opposite last page

TAYLOR-WHARTON GAS TRANSPORTS



provide compact, mobile, economical gas storage

Today many users of bulk compressed gases are turning to Taylor-Wharton Gas Transports for substantial savings and greater flexibility of operations.

Low initial cost, economical gas storage and extreme mobility are some of the advantages which make this unit especially attractive as compared with permanent bulk storage.

Numerous oil refining, petro-chemical, food and electronic companies have found that the use of transports is a practical answer to their needs for interplant haulage and standby equipment.

All transports consist of a group of 2400 p.s.i. seamless steel storage pressure vessels (ICC3A2400) securely mounted to standard semi-trailer chassis. The tubes are valved and manifolded together to a single common outlet within a rear mounted weatherproof cabinet. Capacities range from 38,500 cu. ft. to 56,250 cu. ft. depending on type of gas and size of unit.

For further information, send for our brochure describing these units, mentioning type of gas and storage requirements.

More than a century in Harrisburg

DIVISION OF

Taylor-Wharton Co. **Harsco Corporation** Harrisburg 24, Pennsylvania

When inquiring check 2429 opposite last page

Heater's uses, features, described in sectionalized catalog

Four-section catalog of 42 pages describes steam heat transfer surface unit heaters, blast heaters, and radiators . . . with a general treatment on corrosion in unit heaters. Air distribution charts, heating capacities, and conversion tables are included.

Cat GP 956 is available from D. J. Murray Manufacturing Co., Dept. CP, Wausau, Wis. Specify 2430 on form opposite last page.

No lubrication required on displacement pump for slurries . . .

pneumatic unit will not aerate fluid pumped, has no electrical connections

Uses: Pumping caustic liquids, glycerin, suspended abrasive material, latex, paints and varnishes, inflammable solvents, and similar materials.

Features: Pump is operated by compressed air. It is completely pneumatic and has no rotating or reciprocating parts. No lubrication is required. It is impossible for aeration to take place. The unit is particularly suited for flammable liquids since it has no electrical connections.

Description: Unit operates by displacing liquid to be pumped with compressed air. Ejector creates

Pump has no electrical connections. It is particularly adapted for inflammable liquids

a vacuum in main casing and liquid flows in. When casing is nearly full, air flows into casing and displaces liquid. Intake and discharge strokes begin automatically when pump is connected to any compressed air supply line. Unit is self-timing and can be installed above level of liquid to be pumped.

Standard model has mild steel casing with bronze or cast iron, non-return valves. Float and float rod are bronze. Cast-iron header has bronze fittings. Inconel, stainless steel, Lithcote or other special linings are available to meet the specific requirements. Units will handle discharge heads up to 50 ft when operated with compressed air at 30 to 50 psi. Normal maximum suction is 10 ft. Special ejector allows suction up to 20 ft. Capacities range from 480 to 10,800 gph.

(Ejectopump is a product of Supplies Div., Ferro Corp., Dept. CP, 4150 East 56th Street, Cleveland 5, Ohio . . . . or for more information check 2431 on form which is located opposite last page.)

Illustrates pipe layouts for steam coils

Four-page data sheet contains eight pipe diagrams showing recommended method of piping various steam coil installations. Table lists steam-supply and return-pipe capacities and size recommendations.

Form 2190-3 is issued by Young Radiator Company, Dept. CP, 709 S. Marquette St., Racine, Wis. When inquiring specify 2432 on form opposite last page.

Retards rate of vapor transmission through building material . . .

coating keeps rate below 0.3 gr/sq ft/hr at 1" Hg vapor differential at 80°F

Uses: Controlling transmission rate of water vapor through all kinds of building material.

Features: Retards rate of vapor transmission to not more than 0.3 gr/ sq ft/hr at one inch mercury vapor differential at 80°F.

Description: Coating, which is a vinyl-resin solution, can be applied to interior or exterior surfaces. It will withstand tough weather conditions, and won't chip, crack, or peel. Easily applied to brick, concrete, block, tile, wood, it is available in satin alumnium and wide range of colors.

(VB coating is product of Ellis and Watts, Inc., Dept. CP, PO Box 33, Cincinnati 36, Ohio . . . or for more information check 2433 on form opposite last page.)

"Inside-out" Furnace Construction calls for BALDWIN-HILL dual purpose

SUPER POWERHOUSE CEMENT

B-H Super Powerhouse Cement applied over B-H Mono-Block on Riley-Stoker Pressurized Furnace at large chemical plant.

it Insulates as it Finishes . . .

- Dries fast to smooth, glazed white finish; may be painted with water or oil-base paints or weatherproofed for outdoor application.
- Does not wash off after initial set if exposed to rain before application of weatherproofing.
- Dries without shrinking; no reworking to point up shrinkage cracks.
- Easily troweled; excellent adhesive qualities prevent fall-off during application.

See our catalog in Sweet's Plant Engineering File or write for a copy.

BALDWIN-HILL COMPANY
403 Breunig Ave., Trenton 2, N. J.
Huntington, Ind. Kalamazoo, Mich. Temple, Texas

COMPLETE LINE OF BALDWIN-HILL INSULATING PRODUCTS

B-H Mono-Block	B-H Super Powerhouse Cement	B-H No. 100 Pipe Insulation
B-H Blanket	B-H No. 1 Insulating Cement	B-H 85% Magnesia Pipe Insulation
B-H Koldboard	B-H No. 52 Asbestos Cement	B-H Calcium Silicate Pipe Insulation
B-H Bond-Tite	B-H Spun Felt Insulation	B-H Mono-Kover Pipe Insulation
B-H-Weatherseal	B-H Fine-Fyber Felt Insulation	B-H Spun Mineral Wool Fill

When inquiring check 2434 opposite last page

as easy as stacking coins

Hackney chemical containers stack four high...save shipping, handling and storage costs

Here's the lightweight, stainless steel acid container that builds a safe, compact stack — saves warehouse space and handling time for you. Bottom foot ring of the 15½-gallon Hackney chemical container fits snugly over top ring of lower barrel.

Designed with easy-to-grasp, full curled foot rings for safe, one-man handling and convenient pouring. Your name can be embossed on the bottom ring. Low tare weight reduces transportation costs. Stainless steel protects your dangerous or corrosive chemical products — eliminates breakage losses.

These 15½-gallon containers are just one of the many types and sizes of returnable shipping containers that bear the famous Hackney name. Write today for the complete Hackney Drum and Barrel Catalog.

Pressed Steel Tank Company

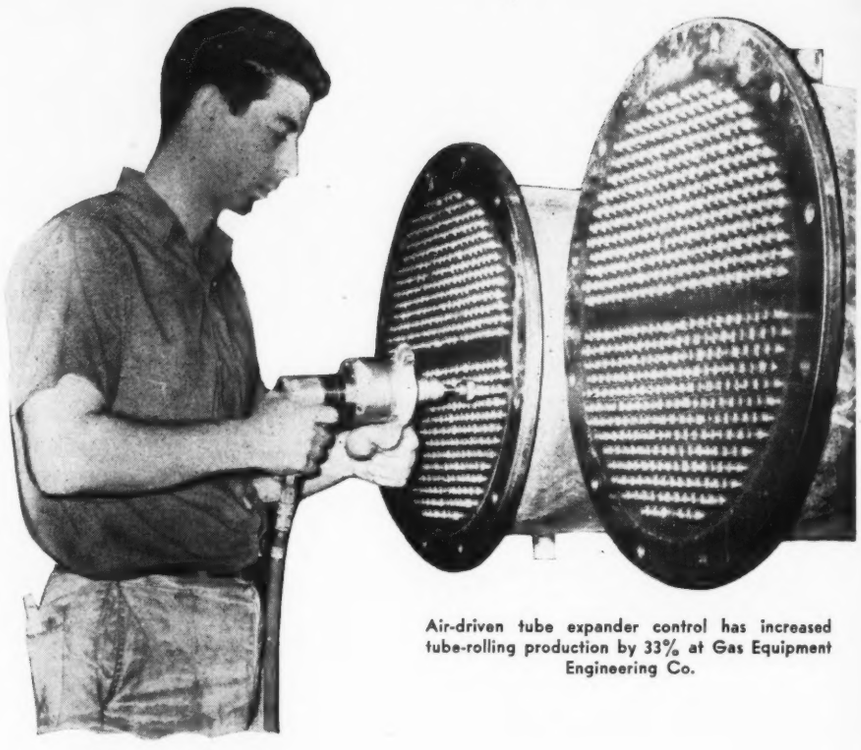
Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check 2435 opposite last page



Air-driven tube expander control has increased tube-rolling production by 33% at Gas Equipment Engineering Co.

Gas Equipment Engineering Co. found that breakage of tube expanders was costing a considerable sum of money. A switch from manual to automatic control of expanders stopped breakage and . . .

increased tube-rolling production 33%

THEODORE W. WETT, Assistant Editor
With **NILS OSTERBERG,** Plant Superintendent
Gas Equipment Engineering Co., Mt. Vernon, N.Y.

Problem: Too many broken tube expanders, and the time consuming checking operation required to maintain proper tube wall thickness, led Gas Equipment Engineering Co., Mt. Vernon, N.Y., to seek an alternate method of expanding tubes in heat exchanger fabrication. Operator doing the expanding used on electric tapper, and control was furnished solely through his sensing the pressure of tool.

To compensate for human error and non-uniform tube sheet holes, operator had to make constant checks with a plug gage and micrometers. It was also necessary to place a stop on mandrel to keep it

from entering too far in tube. Excessive pressures caused many expanders to overheat and break.

In fabricating or repairing heat exchangers, tubes are assembled to the sheet with a tube expander. Expander basically "cold works" tube end to form a tight frictional joint with tube sheet. This rolling not only expands tube but also thins end and causes extrusion. Specific degree of expansion is required to develop maximum joint strength; enough to make it adequately tight to prevent leakage, yet not weaken the joint.

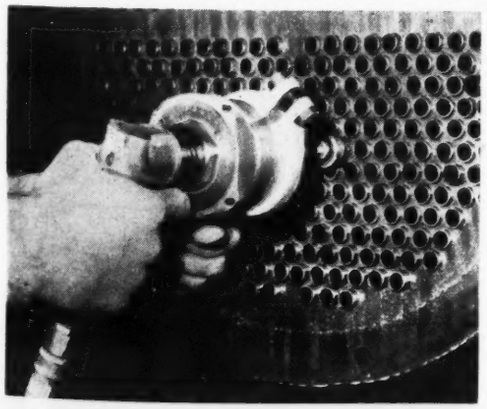
Solution: Recently Gas Equipment Engineering Co. placed in operation a lightweight air-driven tube expander control. Control is simply adjusted through a dial calibrated in foot-pounds torque. When desired torque is reached, expander stops rotating automatically. Since desired torque is measured after metal-to-metal contact, there is no under- or over-rolling.

Operation proceeds as follows: Operator determines amount of torque necessary for a good joint. He checks torque on a sample piece of work. Once correct torque is established tube expanding can proceed uninterrupted. Since torque is measured directly at mandrel, fluctuations in air pressure or other variables have no effect on uniformity.

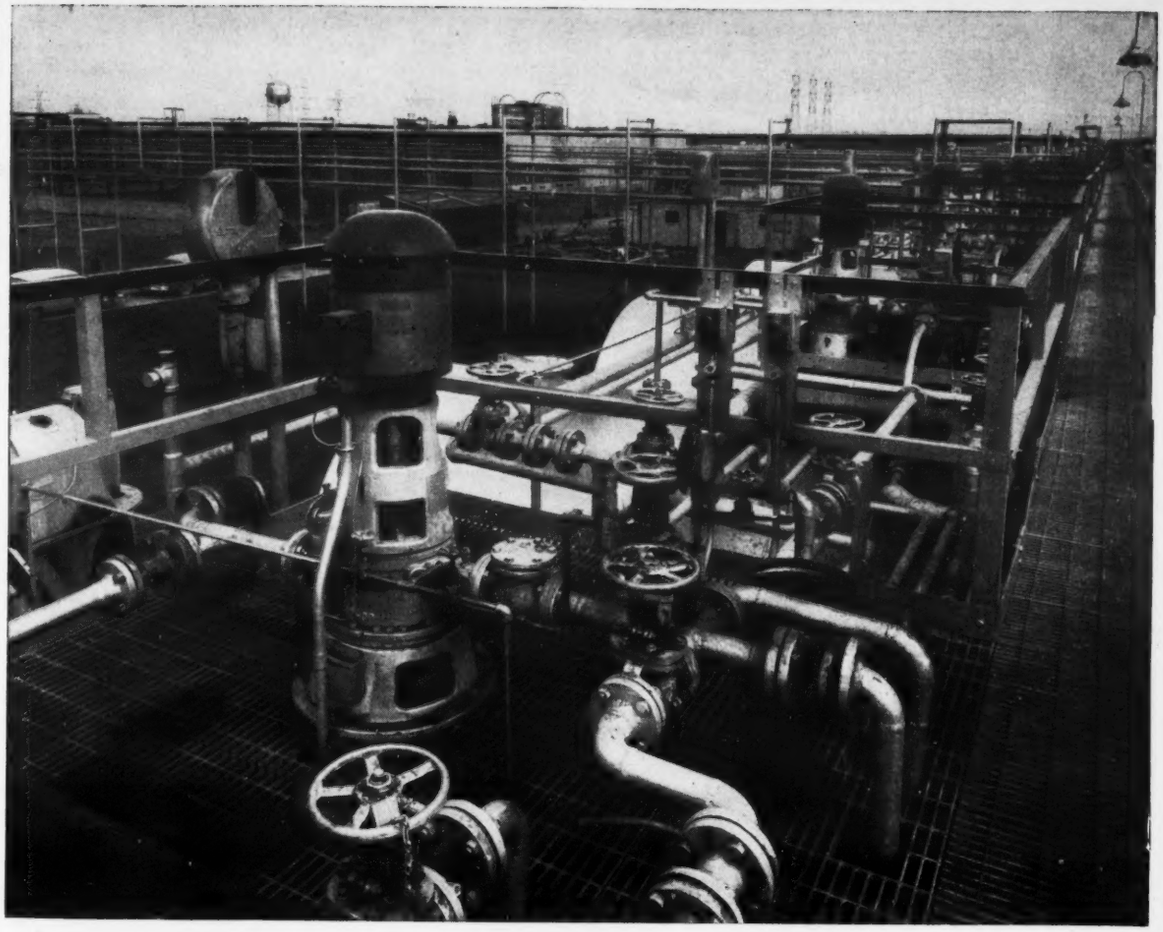
To determine correct torque, internal diameter of correctly expanded tube is first precalculated. To the original ID of tube is added clearance between tube and tube hole in sheet since tube will be expanded to fill this space. Next, amount of reduction in tube wall is also added (generally 4 to 5% for average non-ferrous heat-exchanger). Resulting figure is desired expanded diameter of tube. By trials, operator can find amount of torque necessary to obtain this diameter. No further adjustment is needed.

Results: Since control prevents under- and

(*Please turn to page* 189)



Required torque is set on calibrated dial. Expander stops rotating automatically when this torque is reached



After nine years and thirty million gallons...

This plant of B.F.Goodrich Chemical Company at Avon Lake, Ohio, went into operation in 1948. There were 12 LaBour Type G pumps in the original installation, and by conservative estimate they have pumped something like 30,000,000 gallons of alcohol, plasticizers and blending liquids. All are still on the job 24 hours a day, and total repairs for the lot consist of a few bearing replacements. Since Type G is a packingless pump there has been no packing expense.

When a recent expansion was planned to add materially to the capacity of the plant it was decided not to buy any more pumps. The nine-year-old LaBours had demonstrated such dependability and were in such good condition that they could be trusted to handle the increased responsibility without help.

If you're looking for real economy in pumping, consider this typical LaBour performance record. Difficult jobs and difficult liquids make it even more profitable to assign the task to LaBour. Ask us to prove it.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC., ELKHART, INDIANA, U.S.A.

When inquiring check 2436 opposite last page

▸Dryers ▸Coolers ▸Ammoniators*
▸Granulators*
▸Elevators
▸Conveyors

FOR THE CHEMICAL INDUSTRY

*TVA Licensed Manufacturer

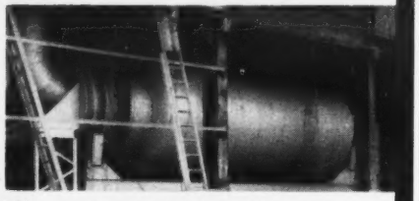
Renneburg DehydrO-Mat Dryer

Built in a wide range of sizes, the DehydrO-Mat Dryer, though comparable in price, out-performs conventional dryers of similar volume. Compact, it is easy to install in a minimum of space. The varying diameter cylinder regulates air and material velocities . . . controls temperature drop and product retention time . . . assures gentle drying.

Renneburg DehydrO-Mat Cooler

This Counter-Current Cooler is similar in external appearance to the DehydrO-Mat Dryer but operates in a very different manner. Among its many outstanding features are:

1. Dustless Operation
2. Large Capacity
3. Compactness
4. Positive *Controlled* Unloading



Straight Shell Dryers and Coolers also available *Literature and information on request*

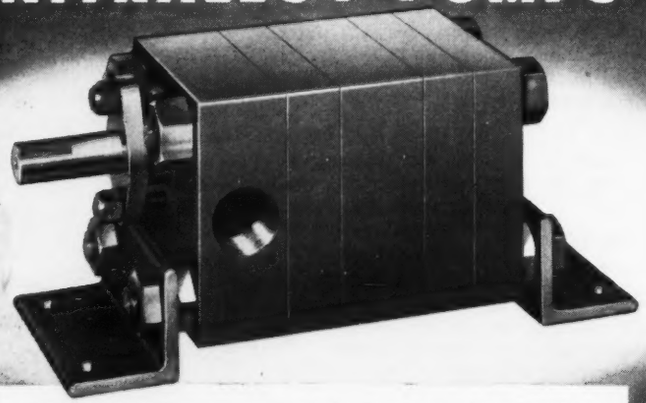
Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

Pioneers in the Manufacture and Development of Processing Equipment for over 80 years.

When inquiring check 2437 opposite last page

NORTHERN NITRALLOY PUMPS



Unique block construction permits selection from a wide choice of metals for virtually any pumping need. Proven in thousands of installations . . . backed by 50 years of engineering and production experience. Unexcelled for precision manufacture, accurate assembly and dependable, long-life operation. Pressures to 2,000 PSI. Capacities from ¼ to 146 GPM. *Write for free catalog and engineering data.*

NORTHERN ORDNANCE, INCORPORATED
Subsidiary
NORTHERN PUMP COMPANY
MINNEAPOLIS 21, MINN.

When inquiring check 2438 opposite last page

Shows electric motors of 1 to 5 hp

Production testing techniques and construction features of drip-proof and enclosed electric motors of 1 to 5 hp are shown and discussed in 12-page bulletin. Servicing and installation advantages are explained.

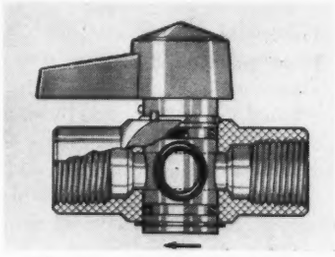
Bul GEA-5980 is issued by General Electric Company, Dept. CP, River Road, Schenectady 5, N.Y. When inquiring specify 2439 on form opp. last page.

Minimum effort required to shut off plug valve against pressure

Uses: Controlling flow of liquids at low or high pressures.

Features: Leakproof shut-off operates with minimum effort. In open position, valve is full ported and permits straight-through flow passage.

Description: Plug uses three "O" rings. In closed position, one ring contained on surface of plug serves as flow seal. Flow seal ring surrounds inlet port and provides tight shut-off.

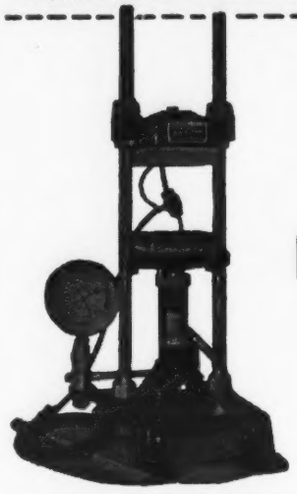


"O" rings permit leakproof shut-off with little effort

Static rings at top and bottom of plug and around its circumference prevent stem leakage. "O" rings eliminate adjustment of nuts and springs. Plug valve is made of brass and is available in ¼" female pipe connectings.

(Leakproof plug valve is manufactured by Circle Seal Products Co., Inc., Dept. CP, 2181 E. Foothill Blvd., Pasadena 8, Calif. Check 2440 opposite last page.)

Standard for Research and Development



the CARVER LABORATORY PRESS

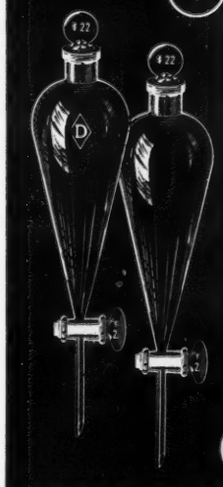
. . . wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
52 RIVER ROAD, SUMMIT, N.J.

When inquiring check 2441 opposite last page

BUDGETING?...
make the "two-way" test

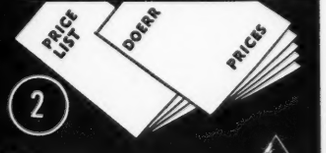


Whether you are responsible for budgets or not, management is always interested in reducing costs. The "TWO-WAY" Test is designed to help you select the highest quality glassware for the lowest possible cost.

THIS IS THE "TWO-WAY" TEST !

STEP 1. Collect several samples of advertised brands of laboratory glassware making sure that one of them is Doerr Diamond D Blue Line. Test these samples for the qualities and characteristics you require in your laboratory and record the results.

STEP 2. Compare the prices of the brands tested. You will find the Doerr Diamond D Blue Line outstrips every competitive brand in quality and sells at the lowest possible cost.



DOERR GLASS COMPANY
Vineland, N. J.

When inquiring check 2442 opposite last page

Tube Expander Control

(*Continued from page* 187)

over-rolling it is no longer necessary for operator to spend time checking accuracy of tube expansion. There is much less strain on operator, which leads to faster, more accurate work. Company reports an increase in tube-rolling production of 33%. This is particularly important where length of equipment downtime depends on rate of retubing.

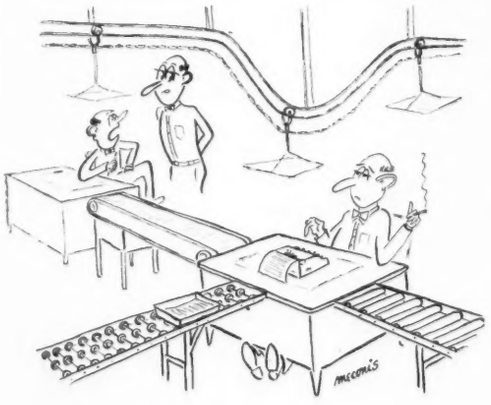
There is no longer any breakage of expanders.

(Torq-Air-Matic tube expander control is a product of Thomas C. Wilson, Inc., Dept. CP, Long Island City, N.Y. Check 2443 opp. last page.)

Electrode selector guide for stainless welds

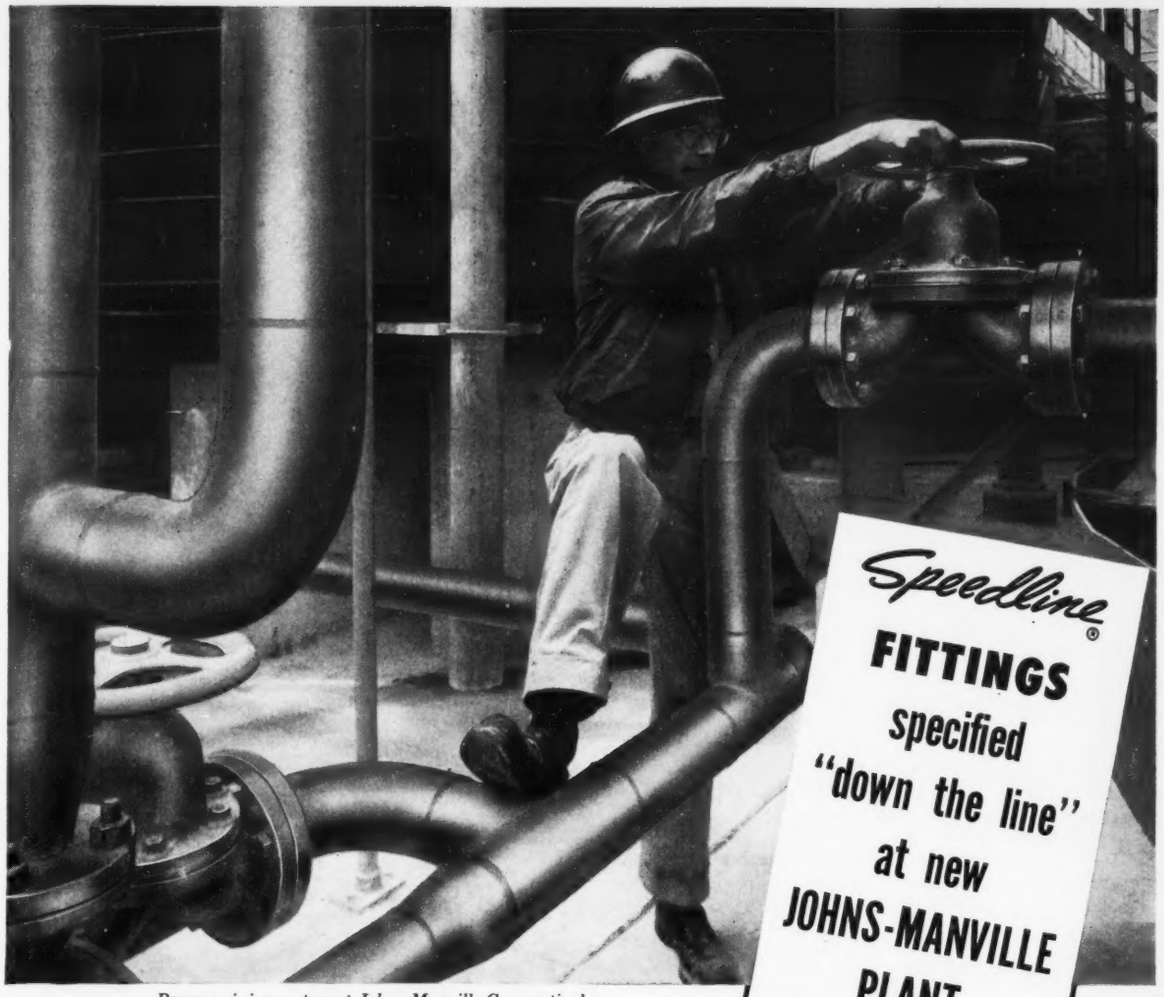
Selection of proper electrode for most welding operations on stainless steels is made convenient by use of four-page guide. Twenty-three stainless electrode types, their chemical analyses and physical properties, and data concerning application to most welding situations are listed. Comprehensive chart of current ranges for stainless steel welding is also included.

Bul AR-10 is issued by Alloy Rods Company, Dept. CP, Lincoln Highway West, York, Pa. . . . or for more information specify 2444 on form located opposite last page.



"It's too early to say anything else . . . but you gotta admit he does a real job of conveying an idea."

Cartoon courtesy of The Rapids-Standard Company, Inc., Grand Rapids, Mich.



Process piping system at Johns-Manville Corporation's "Synthetic Silicates" Plant, Lompoc, California

PROBLEM: To select the best pipe and fittings for a process piping system required to withstand the corrosive action of sulphuric acid, occasionally mixed into the low ph slurry lines. Pipeline is used in manufacturing a high-quality product known as Micro-Cel® —where corrosion would contaminate product and result in messy leaks and expensive pipe replacements. Corrosion would also cause resistance to the flow rate and increase the pumping horsepower requirements.

CONSIDERATION: A study of all available materials under the conditions mentioned above, limited practical selection to three types of pipe including stainless steel pipe.

SOLUTION: Weighing the factors of material cost, ease of installation, labor costs and length of service life, the choice of stainless became obvious; Speedline Fittings and light wall stainless pipe were specified for the *entire* stainless steel piping system.

Speedline fittings are made in a variety of analyses in Schedules 5 and 10. Speedline's exclusive "tangential feature" provides the engineering advantage that simplifies process pipeline assembly.

Once you investigate the use of Speedline Stainless Steel Fittings and low cost, light wall pipe for your particular process lines, you'll discover bonus advantages right down the line. An illustrated brochure describes in detail how a Speedline system can determine efficient process operations at your plant. Write for a copy without obligation . . . or contact the Speedline distributor nearest you.

702

Speedline®

SPEEDLINE IS A REG.T.M. OF HORACE T. POTTS COMPANY

STAINLESS STEEL FITTINGS

THE NEWEST THING IN PIPELINE ECONOMY

SPEEDLINE DISTRIBUTORS ARE LOCATED IN PRINCIPAL CITIES FROM COAST TO COAST

Manufactured by **HORACE T. POTTS COMPANY** • 502 E. Erie Avenue • Philadelphia 34, Penna.

When inquiring check 2445 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc, are found throughout other sections of the magazine

Summarizes manufacturer's organic products

Physical properties and applications of manufacturer's organic chemical products are summarized in four-page bulletin. Included are vinyl monomers, acetylenic alcohols, glycols and hydrocarbons, ditertiary glycols, and non-ionic surface-active agents.

"Products" is issued by Air Reduction Chemical Co., Div. of Air Reduction Co., Inc., Dept. CP, 150 E. 42nd St., New York 17, N.Y. When inquiring specify 2446 on form which is located opposite last page.

Nuclear power plant design described in bulletin

Description of 180,000-kw nuclear power plant to be located near Chicago, Ill., is presented in 25-page bulletin. Detailed information on reactor, turbine plant, auxiliary systems, control and operation, and safety systems is included. Design objective, selection of reactor, and system parameter considerations are discussed.

Bul GER 1301 is issued by General Electric Co., Dept. CP, One River Road, Schenectady 5, N.Y. When inquiring specify 2447 on form which is located opposite last page.

Simplifies selection and ordering of flexible metal hose and tube

Catalog of 64 pages provides design suggestions to help simplify selections and ordering of flexible metal hose and tube for industrial connector applications. Hose and tube specifications, bend diameters, lengths, types, construction diagrams and descriptions of end fittings are included. Catalog contains descriptions of hose and tube made of bronze, brass, steel, stainless steel, aluminum, Monel, super nickel, and other metals as well as plastics.

Cat G-560 is issued by American Metal Hose Division, American Brass Company, Dept. CP, 666 S. Main St., Waterbury 20, Conn. When inquiring specify 2448 on form which is located opposite last page.

Reports on preserving identification of wooden containers outdoors

Report entitled "Preservation of the Exterior Surfaces of Wooden Shipping Containers to Retain Identification Symbols in Long-Term Outdoor Storage" is presented in two parts. Part one describes preliminary tests in outdoor storage, and shows that legibility of marking symbols on several wood panels was preserved by pretreatment with aluminum house paint, marking with barn paint formulations and stencil inks, followed by topcoat treatments with either spar varnish, clear varnish, or high-wax content water-repellent preservatives. Part two summarizes work on preparation, stenciling, treating, and placement of containers under outdoor exposure in four different climates over test period of five years.

Part 1, PB 121432, costing $1.50, and part 2, PB 121431, costing $0.75, may be obtained from the Office of Technical Services, US Department of Commerce, Washington 25, D.C.

Fluorescent analyzer can be carried

Portability is feature of 14 x 12 x 14" fluorescent analyzer presented in illustrated two-page catalog. Containing three light sources, instrument operates on battery or 110v AC-DC. Specifications, prices, and suggested uses are included.

Cat FAC 9-56 is issued by Ultra-Violet Products, Inc., Dept. CP, 5114 Walnut Grove Ave., San Gabriel, Calif. When inquiring specify 2449 on form opposite last page.

Epoxide casting resin for 500°F use

One-page technical bulletin describes epoxide casting resin for 500°F electronics applications. Physical and electrical properties are listed, and step-by-step instructions for use are given.

Tech Bul 7-2-11 is issued by Emerson & Cuming, Inc., Dept. CP, 869 Washington St., Canton, Mass. Specify 2450 opposite last page.

One coat of inorganic zinc coating protects steel surface

Bulletin of four pages covers inorganic zinc coating for cooling towers, tank exteriors, pipe, structural steel, and stacks. It is highly resistant to solvents, petroleum products, salt water, weathering, abrasion. Physical and chemical properties, and list of typical uses are presented.

"Dimetcote No. 3" is issued by Amercoat Corp., Dept. CP, 4809 Firestone Blvd., South Gate, Calif. When inquiring specify 2451 on form opposite last page.

Booklet suggests methods to improve management

Setting standards of performance for managers, from top executives to first-line supervisors, is one of the methods suggested in 70-page booklet for improving company management. Also discussed are: 1) Organization of a central executive committee for planning projects to offset problems incurred by rising costs and technological changes, and 2) return-on-investment concept as a tool for decision-making.

To obtain General Management Series #183, "Improving the Caliber of Company Management", remit $1.75 ($1.00 for members) direct to American Management Association, 1515 Broadway, Times Square, New York 36, N.Y.

Tells how to restore life to used steel drums

Series of four pocket-size booklets tells story of "salvaging" used steel drums and conditioning them for reuse. One booklet gives general information and plan for setting up plant for rehabilitating used drums. The other three deal with descriptions of machinery designed for cleaning, repairing, rehabilitating and reconditioning used drums, and for drying, baking, and painting rehabilitated drums.

Bulletins A, B, C, and 100 are issued by L. M. Gilbert Co., Dept. CP, 710 Schaff Bldg., 1505 Race St., Philadelphia, Pa. When inquiring specify 2452 on form opposite last page.

Starting materials for current molybdenum chemical uses

Information to aid industrial users in selecting the most economical and convenient starting materials for current molybdenum chemical applications is presented in four-page bulletin. Over 50 developmental molybdenum chemicals manufactured for research purposes are named. List of available technical bulletins on uses and properties of these chemicals is included.

Bul Ch-27 is issued by Climax Molybdenum Company, Dept. CP, 500 Fifth Ave., New York 36, New York. Specify 2453 opposite last page.

Describes unit that measures moisture in sealed packs

Four-page brochure describes and illustrates line of equipment for determining moisture conditions in sealed packages without breaking seal or packages. Illustrated with schematics are six mounting assemblies for various types of sealed packs.

Brochure is issued by El-Tronics, Inc., Dept. CP, Mayfield, Pa. Specify 2454 opposite last page.

Outlines standards of control in dust collection

Encompassing wide range of dust control equipment, 16-page bulletin describes importance of dust control in relation to reduced maintenance costs, employe morale, and commercial utilization of dust by-products. Standards of control and efficiency in dust collection are outlined. Case history report demonstrates benefits of dust control in handling community relations problem.

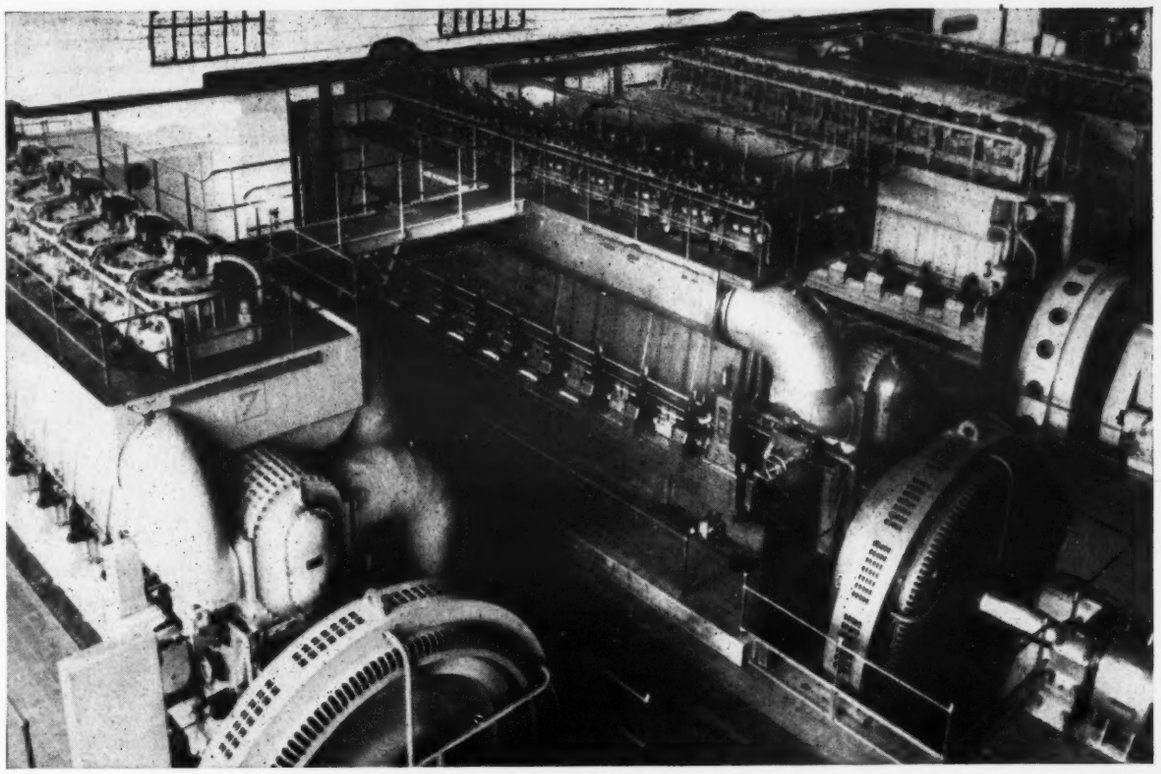
Bul 922 is issued by Pangborn Corp., Dept. CP, 520 Pangborn Blvd., Hagerstown, Md. When inquiring specify 2455 opposite last page.

Testing instruments listed in catalog

Thickness gages, coating hardness tester, surface comparator, large-area colorimeter, ceramic density penetrometer, and gloss recorder are instruments described and priced in 16-page catalog. Other apparatus include electric bunsen burner, miniature distilling unit, automatic aniline point determination unit, and rapid coater.

Newsletter, Vol. 3, No. 6, is issued by Gardner Laboratory Inc., Dept. CP, PO Box 5728, Bethesda 14, Md. Specify 2456 opposite last page.

Look to COOK for Better Rings!



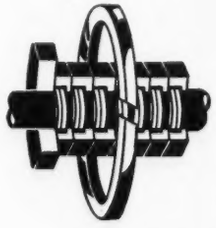
After 25,037 operating hours... Cook rings good for 10,000 more!

HERE'S the result of a cylinder inspection by Rockville Centre, N. Y., municipal power plant officials. It's a report on their No. 8 Diesel unit after almost three years of continuous operation.

"While several rings were replaced in Grooves 1 and 2, Cook rings in Grooves 3, 4, 5 and 6 could run for another 10,000 hours! And cylinders averaged less than .001" maximum wear per 1000 hours of operation."

Light-tight Cook Piston Rings prevent scuffing and blow-by . . . conform perfectly to the cylinder wall because they are re-turned as a final manufacturing process. In addition, Cook rings are tensioned by an exclusive, gentle "squeezing" process that guarantees constant, uniform tension — *for life!*

For complete information on Cook Piston Rings and name of nearest representative, write: C. Lee Cook Company, 920 South 8th Street, Louisville 3, Kentucky.



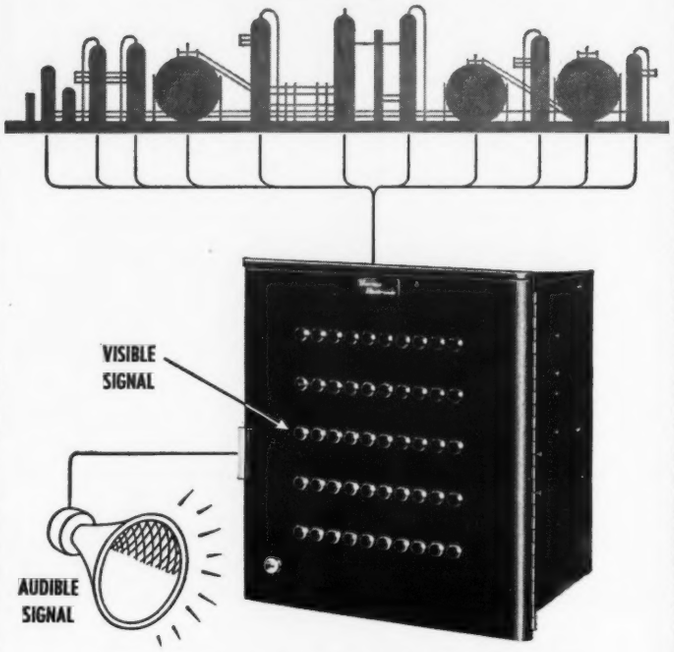
C. LEE COOK COMPANY

A Subsidiary of Dover Corporation

Rings and Packings Since 1888

When inquiring check 2457 opposite last page

Monitor Critical Temperatures From MANY Points



With T-E Temperature Monitoring Systems

For dependable, close checking of many temperatures—T-E offers you a completely integrated, flexible system designed for your *exact* monitoring needs. It can be located near to or remote from the process area and can monitor almost any number of points—up to several hundred in one system. Ideal for all process operations, it also helps reduce down-time by quickly warning of any overheated condition. Dangerous temperatures are indicated by both audible and visible signals.

- **Continuous scanning**
- **Available with single or multiple set points**
- **Monitors temperatures from —320° F. to +3000° F.**
- **Functions with thermocouples or resistance bulbs**
- **Signals may be transferred to indicators or recorders**

Switching Speeds Standard—3 seconds per point. Others as fast as 2.5 points per second or as slow as 6.6 seconds per point.

Write for Bulletin 72-R.

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY
In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

When inquiring check 2458 opposite last page

NEW LITERATURE

Describes over 375 products of chemical manufacturer

More than 375 basic industrial, agricultural, and pharmaceutical chemicals are contained in manufacturer's 40-page, indexed catalog. Detailed descriptive information is presented in tabular form. Included are coating materials, flotation and flocculating agents, glycols and glycol ethers, halogenated organic compounds, ion exchange resins, magnesium alloys, Methocel, organic chelating agents, inorganic and organic acids, plastics and titanium, and other organic and inorganic compounds.

Product catalog is issued by Technical Service and Development, Dow Chemical Company, Dept. CP, Midland, Mich. When inquiring specify 2459 on form opposite last page.

X-ray spectrography data given in wall-chart form

Revised 17½ x 22½" X-ray spectrograph chart shows secondary X-ray beams for elements from magnesium to californium. K alpha and K beta lines are given for these analyzing crystals: EDDT, ADP, topaz, lithium fluoride, and rock salt. L $alpha_1$ and L $beta_1$ lines, first and second orders, for rock salt are included. Horizontal scales show two theta angles in degree and wavelengths in Angstroms for all elements under various operating conditions.

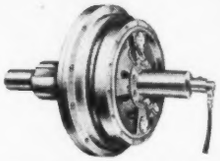
X-ray spectograph chart, 5th Edition (1956), is available from Instruments Division, North American Philips Company, Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N.Y. When inquiring specify 2460 on form opposite last page.

Describes storage tanks, RR cars, process equipment, coatings

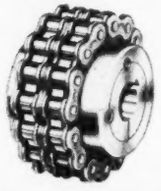
Services and products are described and illustrated in manufacturer's 28-page, two-color bulletin with laminated cover. Detailed information on equipment providing essential conservation requirements for storage of petroleum liquids is featured. Other services and products treated include: dryers and coolers corrosion-resistant nickel alloy coating, mixing devices, fasteners, plastics molding facilities, tank storage terminals, tank and specialized railroad freight cars, gas storage equipment, and research and development facilities.

"General American Services and Products" is issued by General American Transportation Corporation, Dept. CP, 135 S. LaSalle St., Chicago 90, Ill. When inquiring specify 2461 on the convenient Reader Service slip opposite last page.

DODGE PRODUCTS you should know



AIR-GRIP CLUTCHES



CHAIN COUPLINGS

SEALED-LIFE V-BELTS

DODGE BULLETINS YOU SHOULD HAVE

- ✓ Air-Grip Clutches. Technical data, sizes and selection tables. Bulletin A634
- ✓ Chain Couplings, Taper-Lock Sprockets and Dodge Roller Chains. Technical data and selection methods. Bulletin A644
- ✓ Sealed-Life V-Belts. Construction details and complete data on sizes, pitch lengths and outside lengths. Bulletin A606

Write for your copies.
DODGE MANUFACTURING CORPORATION
6200 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

When inquiring check 2462 opposite last page

Rubber gloves' resistance to chemicals rated

Protective-equipment catalog of 28 pages has tables showing chemical-resistance ratings of natural rubber, neoprene, and Buna N gloves. Complete information on each kind of glove is given along with photographs showing various styles available. Other equipment described includes protective aprons and sleeves, low-voltage gloves, and danger flags.

Cat 56B is issued by Charleston Rubber Co., Dept. CP, Stark Industrial Park, Charleston, S.C. When inquiring specify 2463 on form opposite last page.

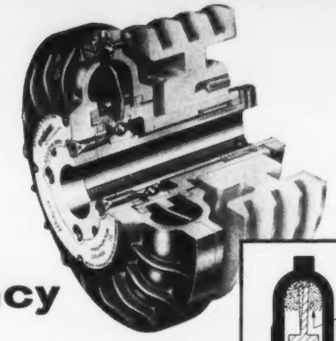
Catalogs rotating evaporators for sensitive materials

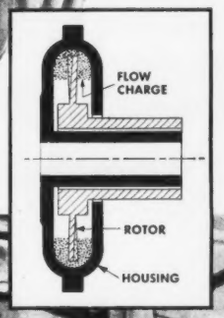
Among the many laboratory instruments described in 64-page supplement to manufacturer's catalog are rotating evaporators for handling heat sensitive materials without damage. Balances, intercommunication systems, ovens, pumps, and tubing are also included. Incorporating a current price list, the supplement details all items added to stock since publication of catalog 50.

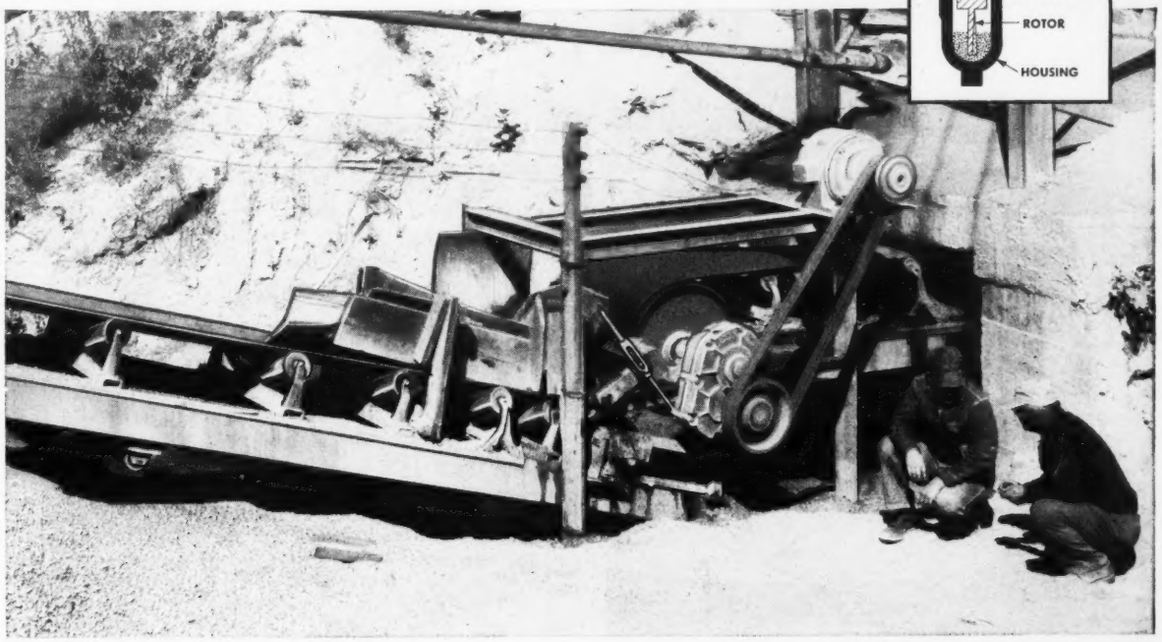
"Labalog" 956 is issued by Schaar and Company, Dept. CP, 754 W. Lexington St., Chicago 7, Ill. When inquiring specify 2464 on form opposite last page.

"What we really need is somebody who can brew good coffee."

This new drive starts loads smoothly... with smaller motors ...and gives 100% efficiency at full load!







FLEXIDYNE
THE DRY FLUID DRIVE

This tunnel conveyor, 225 feet long, handles 500 tons of sand and gravel per hour—8 to 16 hours a day.

With Flexidyne, the motor picks up the load easily and smoothly. Power investment is reduced, power costs cut, maintenance simplified and conveyor belts are protected against breakage.

Flexidyne, the Dry Fluid Drive, is the *new* development that starts loads smoothly, that protects against shocks and overloads, that saves power and that gives 100% efficiency at full load!

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.

After a momentary slip between housing and rotor, the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle. Changes in weather—hot or cold—inside or out—do not affect operation of Flexidyne.

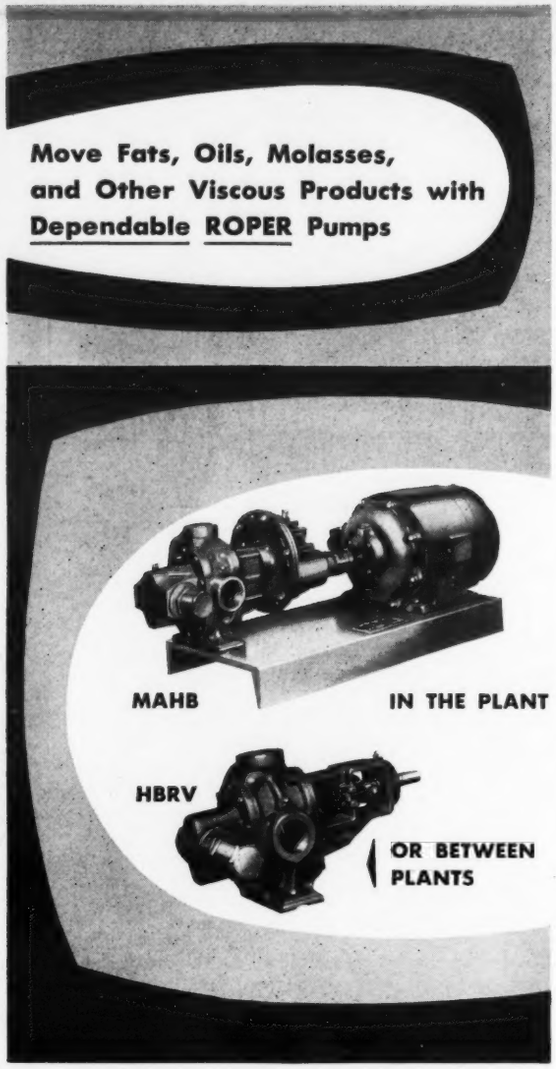
Flexidyne is now available in 8 sizes—for use with electric motors and internal combustion engines from 1 hp to 300 hp. While each size is power rated, the flow charge can be varied at will to give tailor-made torque for your particular job. Write for Bulletin A-640.

DODGE MANUFACTURING CORPORATION
6200 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

When inquiring check 2465 opposite last page



Increase your productivity and reduce overhead costs with smooth, *dependable* Roper Rotary Pumps. The two models illustrated (of the 3600 Series so widely used in virtually every industry) are naturals for transferring fats, oils, sirups, and similar products. Model MAHB is best suited for stationary equipment. Model HBRV is Roper's outstanding general purpose pump that lends itself to tank truck installations. The Roper principle of two moving parts — equal size gears — promotes high efficiency and holds maintenance problems to a minimum. Available in standard fitted, all iron and bronze fitted construction to suit your needs. Series 3600 pumps available in sizes 40-300 G.P.M. — pressures to 100 P.S.I.

ROPER Rotary Pumps

See the Complete Roper Line in 1957 edition Chemical Engineering Catalog

GEO. D. ROPER CORP.
743 Blackhawk Park Ave.
ROCKFORD, ILL.

When inquiring check 2466 opposite last page

NEW LITERATURE

Chemical reactions of fatty alcohols

A very detailed descriptive listing of reactions of fatty alcohols is given in this 16-page book. Over fifty reactions are presented. Technical data on the unsaturated aliphatic and saturated aliphatic alcohols are given, along with the comparison of melting and boiling points of the saturated monohydric alcohols. The bibliography has 70 entries.

Bul No. 907-R is issued by Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. When inquiring specify 2467 opposite last page.

Folder tells how to add antifoam agents

Illustrated four-page folder describes different methods of feeding antifoam agents to batch and continuous processes. Techniques described range from simple manual feeders to complex automatic feeding systems.

"Methods of Application for Hodag Antifoams" is issued by Hodag Chemical Corporation, Dept. CP, 7247 North Central Park, Chicago, Ill. Specify 2468 opposite last page.

Illustrates thickness gage for coatings

Testing instruments for paint, ceramics, plastics, and other materials are described in 16-page bulletin. A gage for measuring the dry thickness of coatings applied to wood, glass, metal, or plastic is shown. Method of use and advantages of the gage are explained. A scratch tester, coating hardness tester, gloss recorder, electric bunsen burner, and colorimeter are other instruments described and illustrated.

Vol 3, No 16 is issued by Gardner Laboratory, Inc., Dept. CP, Bethesda 14, Md. When inquiring specify 2469 on form opp. last page.

Details uses of acrylic rods, tubes, and shapes

Four-page bulletin presents detailed information on acrylic rods, tubes, and shapes. Tables list sizes and physical properties.

"Ace Acrylic Rods, Tubes and Shapes" is issued by Ace Plastic Co., Dept. CP, 91-30 Van Wyck Expressway, Jamaica 36, N.Y. When inquiring specify 2470 on form opposite last page.

Lumenite

AUTOMATIC CONTROLS

ELECTRONIC LIQUID LEVEL
INDUSTRIAL TIMERS
TIME SWITCHES
MAGNETIC SWITCHES

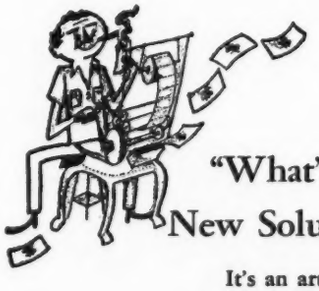
Ask for Bulletin

FL—Liquid Level
FM—Milk Level
FN—Nonconductive Liquid
ITC—Ice Thickness
BH—Boiler Level

LT—Time Switches
PC—Program Clocks
CR—Cycle Repeaters
R—Time Delay Relay
RMC—Automatic Reset

Lumenite Electronic Company
407 S. Dearborn Street Chicago 5, Ill.

When inquiring check 2471 opposite last page



"What's A New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

Tells development of fabric to resist heat, chemicals

Development of coated glass fiber fabric to protect personnel from brief exposure to chemical fires at temperatures up to 1000°F is described in 88-page report. Fabric is flexible and useful over range of −80° to 390° F and is not penetrated by reaction products of ethylanilinefuming nitric acid combustion.

To obtain report, PB 121212, remit $2.25 direct to Office of Technical Services, US Department of Commerce, Washington 25, D.C.

Line of hydrometers described

Hydrometers with scales in percentage of alcohol, API, Baume', Brix, percentage of calcium chloride, proof, percentage of salt saturation, specific gravity, and Twaddell calibrations are illustrated and described in eight-page bulletin of two colors. Thermo-hydrometers with scales in API, Brix, and specific gravity calibrations are included. Instruments calibrated in sp gr are available as complete sets. Two sets are shown: one consisting of eight spindles to cover sp gr from 0.700 to 2.000 at 60°/60°F, the other having twenty spindles to cover sp gr from 0.700 to 0.950 at 60°/60°F.

Bul G-3 is issued by Precision Thermometer & Instrument Co., Dept. CP, 1434 Brandywine St., Philadelphia 30, Pa. When inquiring specify 2472 on form opposite last page.

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Would you like to receive your own copy regularly . . . for greater convenience in reading?

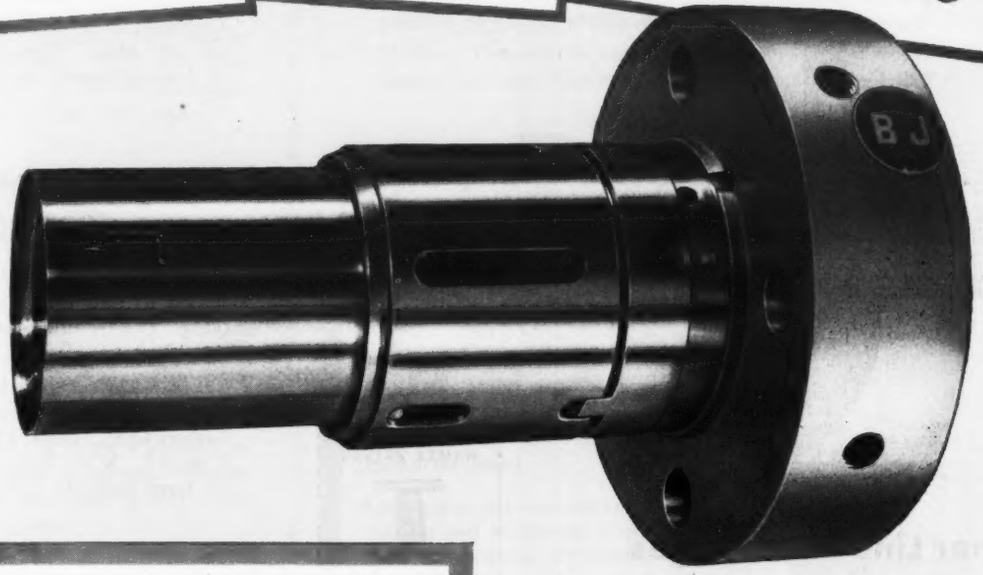
If you are responsible for processing operations in an administrative, production management, engineering or technical function, it may be possible to send you copies of CHEMICAL PROCESSING regularly, without charge.

Complete the request-form opposite the last page of this copy and send it along to us — no obligation, of course.

This ONE BJ Mechanical Seal...

Answers THREE Pumping Services...

With only the change of GASKETS!



1 HIGH OR LOW TEMPERATURES
The BJ *ASBESTOS* GASKETS handle temperatures from minus 100°F to plus 650°F.

2 CORROSIVE
The BJ *TEFLON* GASKETS answer a wide range of corrosive fluids.

3 HIGH PRESSURE
The BJ *RUBBER* GASKETS handle pressures to 1000 PSI . . . and any general service needs.

This *one* basic Byron Jackson Type U Mechanical Seal solves *three* major pumping services with only the change of two gaskets. You benefit because: (a) you can *standardize* on this basic BJ Type U Seal and thus greatly reduce your parts and inventory needs; (b) you can convert process pumps to changes of service with only the change of two gaskets; and (c) you *eliminate* costly, troublesome stuffingbox repacking and unnecessary pump downtime.

Only Byron Jackson... the leader in Mechanical Seals ...offers this simplified interchangeability of service through a change of gaskets.

If your operations involve multiple pumps with variations in service requirements, look into this basic BJ Type U Seal. If your pumping needs are more highly specialized in any one field, there's a BJ Mechanical Seal engineered to solve almost every stuffingbox requirement.

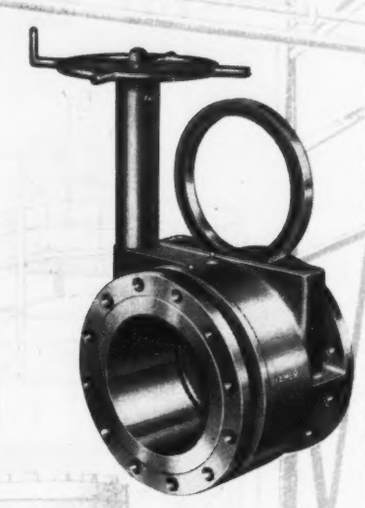
FREE MECHANICAL SEAL SELECTION PORTFOLIO—Send for this special Byron Jackson Mechanical Seal Selection Portfolio. Includes size, material, price and installation information. Write today to:

Byron Jackson Pumps
INC.
A Subsidiary of Borg-Warner Corporation
P.O. Box 2017A, Terminal Annex
Los Angeles 54, California

BJ

When inquiring check 2473 opposite last page

PUTTING THE "ABSOLUTE" IN LINE SHUT-OFF...



Hamer Line Blind Valves

It has long been recognized that conventional type valves do develop leaks. And contamination of product when it occurs costs dearly in time and money. Preventing this is where Hamer Line Blinds excel. Handwheel or bar operated, Hamer Line Blind Valves squeeze dead tight against the center spectacle plate forming an impassable line shut-off that's both permanent and absolute. Yet Hamer Line Blinds are fast, safe, simple to operate. One man can open or blind a line in one minute. Investigate Hamer Line Blinds. Let a Hamer representative show you how these remarkable valves can actually pay for themselves.

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OTHER FINE HAMER VALVES

Leak-proof Gate Valve

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Lift-type Plug Valve

Hamer *VALVES INC.*

P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Representatives throughout the World

When inquiring check 2474 opposite last page

NEW LITERATURE

How petroleum industry uses radioactivity

Applications of nuclear techniques in research and refinery operations, new developments in instrumentation, and health physics considerations were some of the subjects covered in recently held symposium. Abstracts of speeches plus a comprehensive glossary of nuclear terminology are contained in 44-page bound booklet.

Booklet is issued by Symposium Committee, Tracerlab, Inc., Dept. CP, 130 High St., Boston 10, Mass. When inquiring specify 2475 on form opposite last page.

2-Methyl-5-ethyl pyridine

An intermediate for preparation of pharmaceuticals and certain synthetic fibers and synthetic rubbers, 2-methyl-5-ethyl pyridine is the subject of this 6-page technical bulletin. Physical properties and specifications, applications and chemical reactions are covered in detail.

Bul F-7621 is issued by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 2476 on form opposite last page.

Semi-micro laboratory supplies alphabetically listed

Alphabetical listing of numerous types of equipment adaptable to micro and semi-micro techniques is given in 23-page catalog. Items include balances, hot plates, centrifuges, water baths, magentic stirrers, and glassware. Illustrations and prices accompany description of each item.

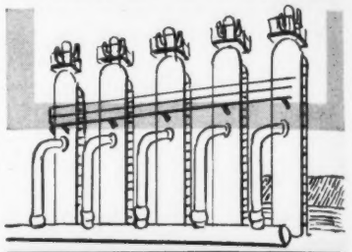
"WACO Semimicro Apparatus" Catalog is issued by Wilkens-Anderson Co., Dept. CP, 4525 W. Division St., Chicago 51, Ill. When inquiring specify 2477 on form opposite last page.

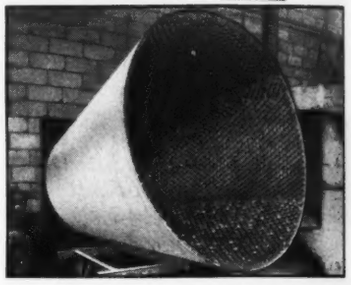
Reports on use of carbon steel loop in pressurized water reactor

Thirty-page report covers Navy research project on replacing stainless steel loops with low-carbon steel loops for carrying primary coolants in pressurized water reactor system. Tests were made in an in-pile run at AEC's Materials Test Reactor.

To obtain PB 121319 remit 75c direct to Office of Technical Services, US Department of Commerce, Washington 25, D.C.

FEWER "TURN-AROUNDS"





Shutdowns for repairs of fire clay linings in refractory units are expensive. The frequency and duration of these shutdowns can be greatly reduced by the use of a steel grating armor known as "Gridsteel", which holds the castable refractory linings in place longer and armors them against the bombardment of catalytic elements.

"Gridsteel" is available in a special loose clinch to conform easily to curved surfaces.

For complete information, write for brochure on Irving "Gridsteel" Contour Retainer Mesh

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Offices and Plants at
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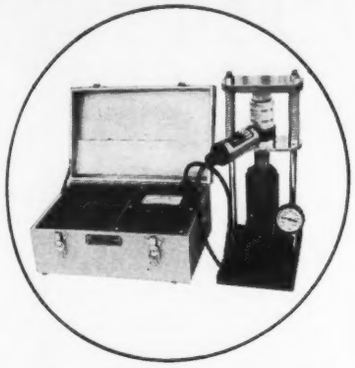
When inquiring check 2478 opposite last page

Moisture Costs Money!



Save the high costs of too much or too little moisture. Measure moisture content quickly, economically with **Granular Moisture Register G5**—insure product uniformity and quality!

1 minute test! No stopping for time-consuming, expensive laboratory tests.

Accurate readings to 0% within close tolerances!

Use on production line! Voltage regulated electronic power supply, or battery operated. No skilled technicians required.

Two Weeks Free Trial! Test the G5 in your plant. No obligation. Satisfaction is guaranteed.

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DOZENS MORE

ELECTRONIC MOISTURE REGISTER *Instruments*

Moisture Register Co., Dept. CPA, 910, Alhambra, Calif.

☐ *We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.*

We will want to test _____

in a moisture range from ____ % *to* ____ %.

Firm Name _____

By _____ **Title** _____

Address _____

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When inquiring check 2479 opposite last page

V-belt production, engineering, design, facts and figures

Horsepower ratings of V-belts and other vital data in 66-page manual provide basis for selecting V-drives for any specific job. Manual is divided into three sections covering V-drive selection, design, and general information on engineering, research, production, and service. Laminated covered manual has holes punched for convenient insertion into three-ring binder and thumb index for quick reference to individual sections.

"V-belt Drive Engineering Manual" is issued by Maurey Manufacturing Corp., Dept. CP, 2915 S. Wabash Ave., Chicago 16, Ill. When inquiring specify 2480 on form opp. last page.

Explains fundamentals of softening, and equipment selection

Necessity for water softening is covered in 20-page bulletin. Fundamentals of softening are explained, and selection of equipment and zeolites is discussed. Operation of manufacturer's hydromatic valve for manual or automatic control of cycling process is described.

Pub 4520 is issued by Cochrane Corporation, Dept. CP, 17th St. below Allegheny, Philadelphia 32, Pa. When inquiring specify 2481 on form opposite last page.

Catalog describes templates and other drafting materials

All types of drafting templates are described in detail in company's 80-page general catalog. Other drafting materials and equipment used by engineers, architects, draftsmen, and designers are also illustrated and described. Up-to-date price lists are included for all equipment.

Cat "E" may be obtained by letterhead request from Alvin & Company, Windsor, Conn.

Tells about corrosion-resistant tank liner

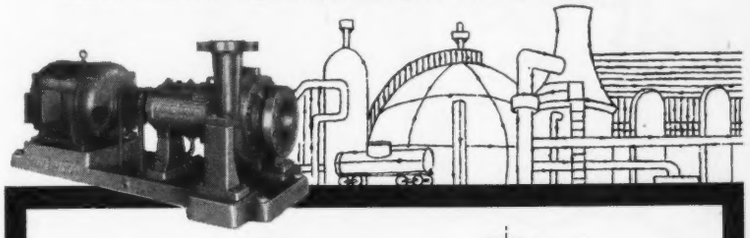
Liner for wood, metal, concrete, or other tanks is discussed in four-page bulletin. Corrosion-resistant advantages of unplasticized PVC liner are pointed out, and results of a typical outdoor cyclic heating test are listed. Design principle is explained and shown in drawings.

Bul 4EL is issued by Industrial Plastics Div., H. N. Hartwell & Son, Inc., Dept. CP, Park Square Bldg., Boston 16, Mass. When inquiring specify 2482 on form opposite last page.

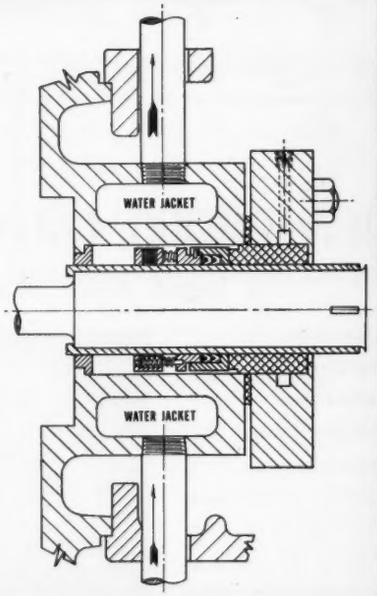
HOW! PUMP USERS—

Avoid Stuffing Box Leakage of Expensive Liquids on High Temperature Service —with a Simple Standard Seal

Dean Brothers Pumps was first to offer a complete line of high temperature centrifugal pumps with a mechanical seal of standard manufacture. This permits use of standard mechanical seals on heat transfer and other high temperature processes up to + 750° F.



- **Water jacket encircles full length of extra deep stuffing box . . . keeps temperature well below thermal limits of seal without cooling the liquid in the casing.**
- **Stuffing box accommodates mechanical seal or packing, interchangeably, without modification. Pumps can be changed from packing to mechancial seal, in the field, with no alterations.**
- **Cooling water for pump can be taken directly from plant supply. No special or auxiliary equipment is needed.**
- **Large shaft diameter and short shaft overhang reduce shaft deflection . . . eliminate wear on mechanical seal.**



Like to know more about Dean Brothers mechanical stuffing box sealing for high temperature service? Write for Circular No. 189 or our recommendations for your particular application.

DEAN BROTHERS PUMPS INC.

EST 1869

323 West 10th St., Indianapolis 7, Ind.

When inquiring check 2483 opposite last page

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When inquiring check 2484 opposite last page

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When inquiring check 2485 opposite last page

NEW LITERATURE

Lists conveyor equipment

Catalog of 48 pages contains line drawings, photographs, and schematics describing line of conveyors and their applications. Featured are enclosed tube conveyor for bulk handling, steel belt conveyors and elevators, and automatic elevator for handling small parts magnetically. Conversion equations and density tables are included.

Cat 500 is issued by Prab Conveyors, Inc., Dept. CP, 30121 Groesbeck Hwy., Roseville, Mich. When inquiring specify 2486 opposite last page.

Sodium lauryl sulfate in needle form

Needle form of sodium lauryl sulfate eliminates dust problem, also averages 83% active material. Four-page leaflet tells specs, how to make solutions and pastes.

Tech bul on Solasol Needles is issued by Aceto Chemical Co., Inc., Dept. CP, 40-40 Lawrence St., Flushing 54, N.Y. When inquiring check 2487 on form opposite last page.

Presents technical problems affecting national defense

Thirty-five new technical problems for attention of nation's civilian inventors, assigned by Department of Defense to National Inventors Council, US Department of Commerce, are published in supplement to Council's cumulative list. Problems range through fields of chemistry, plastics, material handling, and other scientific fields.

Cumulative list and supplement, "Technical Problems Affecting National Defense", is issued by NIC, US Department of Commerce, Washington 25, D. C.

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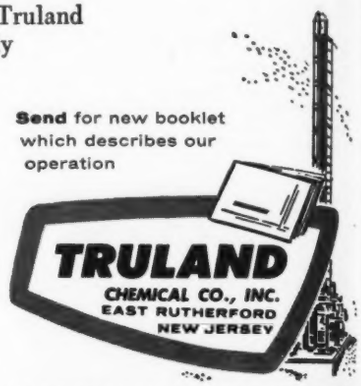
will PURCHASE or REFINE . . . for your account.

The facilities and experience of Truland may be employed advantageously for the economical upgrading and disposal of solvent mixtures and organic by-products. Our technically trained personnel are available to discuss the refining of any solvent mixture or organic by-products.

Send for new booklet which describes our operation



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When inquiring check 2488 opposite last page

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When inquiring check 2489 opposite last page

Explains selection of polarographs

Including explanation of fundamentals of polarography, two-color booklet of eight pages suggests methods of selection of polarographs according to requirements. Three models are described. Polarographic accessories and cells are listed.

"Polarographs" is issued by E. H. Sargent & Co., Dept. CP, 4647 W. Foster Ave., Chicago 30, Ill. When inquiring specify 2490 on form opp. last page.

Entire motor line shown in color

Descriptions and four-color illustrations of manufacturer's complete line of motors and drives are presented in eight-page bulletin. Open, totally-enclosed, and explosion-proof units are described.

Bul 1878 may be obtained from U.S. Electrical Motors Inc., Dept. CP, PO Box 2058, Los Angeles 54, Calif. When inquiring specify 2491 on the convenient Reader Service slip opposite last page.

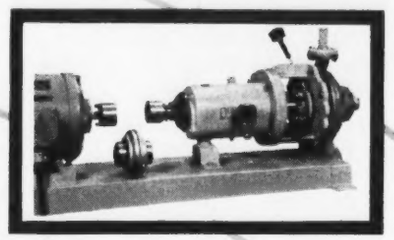
Aid to draftsmen

Tracing templates to aid draftsmen in drawing valves are provided without charge by manufacturer. Templates, containing top, side, and front views of 24 valves, are in one-quarter, one-half, and full size.

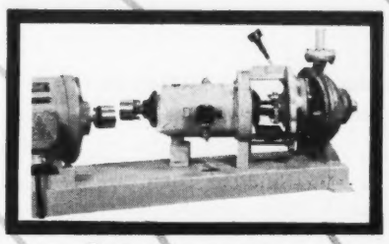
Templates are offered by Ross Operating Valve Co., Dept. CP, 120 E. Golden Gate Ave., Detroit 3, Mich. When inquiring specify 2492 on the convenient Reader Service slip which is located opposite last page.

For more information on product at right, specify 2493 . . . see information request blank opposite last page.

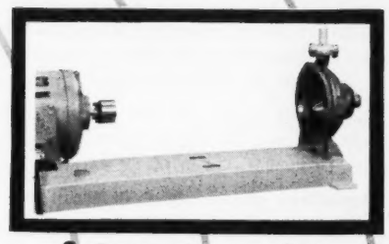
Time is money - and so is labor!



1. Remove spacer from coupling.



2. Remove cap screws.



3. Remove the pump. Note: Neither suction or discharge lines are disturbed, nor is motor or alignment affected.

3 simple steps remove SERIES H DURCOPUMPS for maintenance

Lower operating and maintenance costs with rugged, dependable, Series H Durcopumps. Simple design and sturdy construction assure long hours of trouble-free pumping. Easy, three-step, one-trade maintenance reduces down time, speeds maintenance, and lowers costs. Series H Durcopumps are available in Durimet 20, the 300 series stainless steels and in eleven other standard alloys for pumping all types of corrosive solutions. A complete range of pump sizes accommodates heads to 350 ft. and capacities to 4500 gpm. Write for details.

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Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, and Pittsburgh.

Pure carbon from decomposition of carbon monoxide

Patents and literature on production of carbon from carbon monoxide have been listed and described in this 41-sheet book. Thirty-two patents and 160 literature references are given.

"Annotated Bibliography of Literature and Patents Relating to the Production of Carbon by Decomposition of Carbon Monoxide" may be obtained on direct letterhead request to Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa.

Graph shows power requirements of acid handling pump

Design features, applications, sizes, and capacities of acid handling pump are described in six-page bulletin. Graphs indicate power requirements and performance data. Photographs and cross-section drawings show equipment in detail.

Bul 5004 is issued by Dorr-Oliver Inc., Dept. CP, Barry Place, Stamford, Conn. When inquiring specify 2494 on form opposite last page.

Describes gas analysis instrument for plant, lab, and field

Gas analysis instrument for evaluating thermal conductivity method and developing sampling systems is described in four-page bulletin. Uses and general specifications are detailed. Parts list identifies all parts of instrument. Table containing typical deflection values, and bibliography on thermal conductivity methods for gas analysis are included.

Bul GMH 9-56 is issued by Gow-Mac Instrument Company, Dept. CP, 100 Kings Road, Madison, N.J. Specify 2495 on form opposite last page.

Shows research facilities

Manufacturer's research facilities available to industry on contract basis are described in 12-page bulletin. Services are explained and case histories of development projects are reviewed. Illustrations of pilot plant area show some of facilities available.

"Research Division" is issued by The Fluor Corporation, Ltd., Dept. CP, 2500 S. Atlantic Blvd., Los Angeles 22, Calif. When inquiring specify 2496 on form opposite last page.

GARLOCK and U

Announce

THE COMPLETE INTEGRATION OF THEIR SALES FORCES

Now, the United States Gasket Company will be known as the United States Gasket Company, Plastics Division of The Garlock Packing Company.

In August 1955 Garlock acquired the United States Gasket Company. Subsequently, the production facilities of both companies were integrated. Now, it is clear that the customers of both companies will be better served through an integrated sales force.

Better Service for Customers

Both U.S.G. and Garlock customers will now enjoy the finest, most complete service available in the fields of fluorocarbons (Teflon* and Kel-F**), nylon and other plastics as well as mechanical packings and seals of all types. Specialists in specific materials and applications will always be available for consultation on your problems.

Saves You Time

This integration of sales forces will also simplify your purchasing problem . . . you can standardize on one reliable source of supply and have more time to devote to other important problems.

Unbiased Recommendations

With the addition of U.S.G. plastic products to the famous "Garlock 2,000" family of packings, gaskets, and seals, your local representative is able to supply the right seal for every conceivable need. Call him at the office nearest you.

30 Sales Offices

U.S.G. plastics specialists join the 125 Garlock salesmen at 30 sales offices and warehouses where large stocks of plastic products are stored. This means faster deliveries from local stocks, as well as expert plastics and sealing assistance as close as your telephone.

*DuPont Trademark
**M.W. Kellogg Trademark

Main Factory Buildings of The Garlock Packing Company, Palmyra, New York. Other factories in San Francisco and Canada.

One of the two Camden, N.J. plants of the United States Gasket Company, Plastics Division of The Garlock Packing Company

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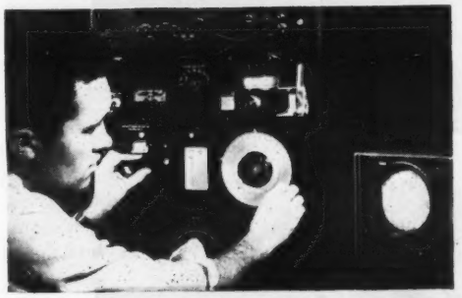
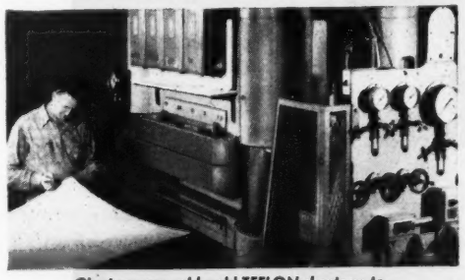
SPECIALIZED PLASTICS PRODUCTS FACILITIES AT U.S.G.

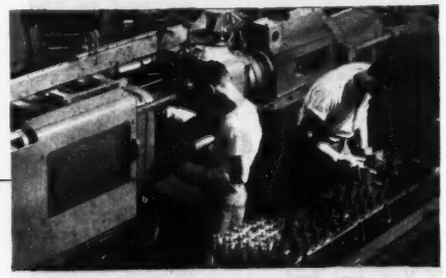


Three completely equipped laboratories—electrical, chemical and physical—are staffed by top-flight research, production and development engineers.

One of many extruders for TEFLON, KEL-F and nylon rods, tubes and special shapes.



Giant presses cold mold TEFLON sheets up to 48" x 48" in size, ready for sintering.



High product, low-cost injection molding of thermoplastic parts to manufacturers specifications.

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Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

When inquiring check 2497 opposite last page

Filter removes submicron particles from distilled water

Membrane-type filter for removing submicron particles from distilled or demineralized water is described in two-page bulletin. Unit can handle up to 100 gph. Bulletin points out how method opens up new process techniques in electronic and nucleonic fields. Other uses, as well as a description of the filter and its capacities, are discussed.

Bul 141 is issued by Barnstead Still & Demineralizer Co., Dept. CP, 2 Lanesville Terrace, Boston 31, Mass. When inquiring specify 2498 on form opposite last page.

Welding rod comparison chart provides useful information

Comparisons between manufacturers' products and competitive makes are listed in four-page bulletin. Chart details physical properties as welded, and gives analysis, tensile strength, elongation, and average Rockwell hardness. It also lists typical uses of gas welding rods, bare electrodes, automatic welding wire and metal spray wire.

Bul DH-1218-J is issued by Page Steel and Wire Division, American Chain & Cable Company, Inc., Dept. CP, Monessen, Pa. When inquiring specify 2499 opposite last page.

Announces small pellet mill with V-belt drive

Specifications and detail drawings are included in four-page bulletin on small version of manufacturer's pellet mill. Hinged die casing, gearless V-belt drive, tool-steel dies, and other construction features are discussed.

Bul 165 is issued by Sprout, Waldron & Company, Inc., Dept. CP, 83 Logan St., Muncy, Pa. Specify 2500 opposite last page.

Why no subscription price for this magazine?

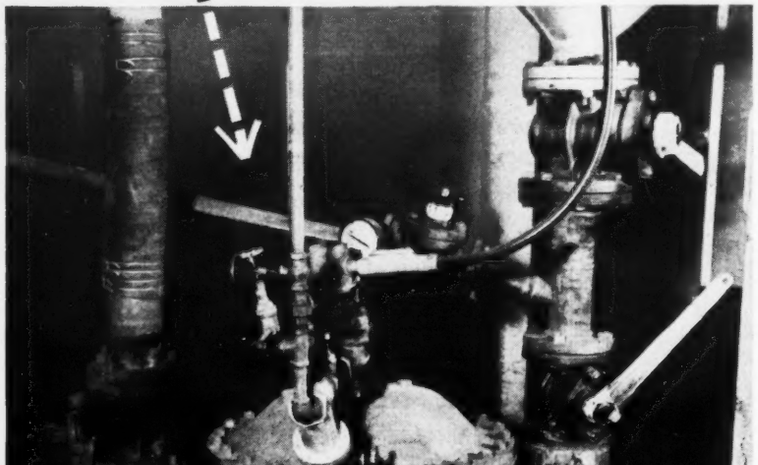
You might think it odd that you get CHEMICAL PROCESSING without demand of a formal subscription charge. But it really isn't so strange!

See page 79.

Only

OLIVER Diaphragm Pumps

satisfactorily handle heavy abrasive slurry at MANGANESE CHEMICALS CORP.



The Problem at Manganese Chemical Corp., Riverton, Minn., was to find a method of pumping abrasive slurry containing 60% solids. The material — underflow from the thickeners — had to be transferred to a still to be stripped of NH_3 and CO_2 in $MnCO_3$ processes.

After considering a number of different pumps *The Solution* was provided with the installation of several Oliver Diaphragm Pumps . . . *the only* pumps that would satisfactorily handle the heavy slurry.

In operation, air pressure of 60-70 psi is applied to diaphragm at regular intervals to force slurry through pump. Each time air pressure is released by an electric timer, about 6 gallons of slurry is moved. A three-way solenoid valve controls the air. Rate of flow can be changed without stopping the operation.

If you have a slurry or liquid handling problem, the ODS Diaphragm Slurry Pump will do the job more efficiently with less maintenance cost. Write for Bulletin 309-R.

Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Ask for their assistance.

*Trade Mark Reg. U. S. Pat. Off.

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When inquiring check 2501 opposite last page

NEW LITERATURE

Power transmission products cataloged

Gears, racks and pinions, miters, chains and sprockets, bushings, drives and reducers, variable-speed drives, couplings, bearings, and pulleys are cataloged in 576-page, pocket-size data book. Dimensions, weight, performance tables are given.

Cat 56 is issued by Power Transmission Equipment Co., Dept. CP, 1245 W. Fulton St., Chicago 7, Ill. When inquiring check 2502 on form opposite last page.

ASTM panel discussion on pyrometric tests

Booklet of 78 pages presents panel discussion held at ASTM Annual Meeting held at Atlantic City, June 30, 1955, on pyrometric practices. Properties and high-temperature testing of metals are discussed.

To obtain "Panel Discussion on Pyrometric Practices" ASTM Technical Publication No. 178 remit $1.50 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pennsylvania.

Covers corrosion-resistant process equipment

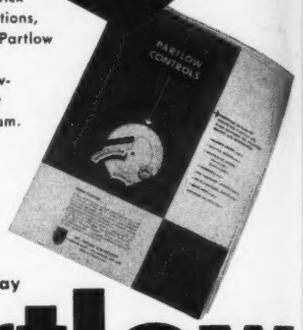
Complete line of corrosion-resistant process equipment is discussed in 12-page bulletin. Photographs are used to show design and construction features of reactors, columns, condensers, heat exchangers, tanks, and accessory equipment. Materials of construction include glassed steel, stainless steel, titanium, and other corrosion resistant materials.

Bul 936 is issued by The Pfaudler Co., Dept. CP, 1000 West Ave., Rochester 4, N.Y. When inquiring specify 2503 on the convenient Reader Service slip opposite last page.

How to cut costs with Partlow Temperature Controls

SEND FOR THIS FREE CONDENSED CATALOG

Here's a handy guide for quick reference! Contains illustrations, brief descriptions, prices of Partlow Temperature Controls. Lets you see at a glance how low-cost Partlow Controls can fit into your production program. Controls listed cover temperature range from -30°F. to 1200°F. — for industrial heating and refrigeration.



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THE PIONEER IN MERCURY THERMAL CONTROLS

THE PARTLOW CORP., Dept. P-357, NEW HARTFORD, N.Y.

Offices in All Principal Cities

When inquiring check 2504 opposite last page

MARKING TOOLS *for Every Need*

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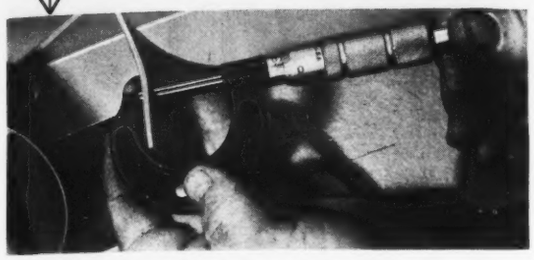
When inquiring check 2505 opposite last page

Plastisol coatings protect "in depth"



Plastisol coated products get *seamless* protection against acids, alkalies, moisture, other corrosives.

Thickness of 60 mils or more per coat can be sprayed with Unichrome "Super 5300" Coating. Products dipped into a Unichrome Series 4000 Coating can have a protective coating up to 3/16 inch thick. Such body means *pore-free* protection, ample section to absorb damaging impact, and a *long-wearing* finish.

The finish has satiny gloss, resists abrasion, deadens sound, insulates electrically, doesn't age and crack. Send for Bulletin VP-2.

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When inquiring check 2506 opposite last page

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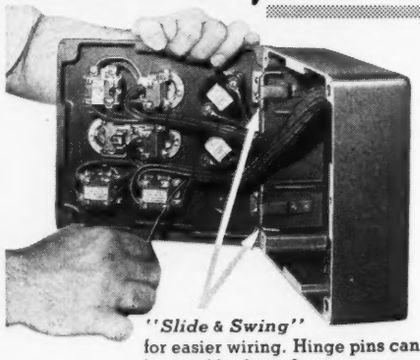
Square D OIL-TIGHT PUSHBUTTON STATIONS
with "Slide & Swing" HINGE COVERS



"Slide & Swing" for easier wiring. Hinge pins can be quickly slipped out to remove cover when installing units.

Write for Bulletin 9001 Type T. Address Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

When inquiring check 2507 opposite last page

NEW LITERATURE

Features data system for process control

Brochure of 16 pages in two colors illustrates data system for process control. System is described as "link between sensing elements and computer". Applications suggested include process monitoring for both process and pilot plant control.

Bulletin 494 "Model 111" is issued by Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Road, Fullerton, Calif. When inquiring specify 2508 on form opposite last page.

Nitric acid pressure process described in bulletin

Four-page, two-color bulletin describes pressure process for manufacturing nitric acid. Typical operating requirements are included, along with process description and simplified flow diagram.

"Nitric Acid Plants" is issued by The Fluor Corporation, Ltd., Dept. CP, 2500 S. Atlantic Blvd., Los Angeles 22, Calif. When inquiring specify 2509 on form which is located opposite last page.

Here's condensed info on shovel-cranes

Eight-page foldout catalog in two colors gives condensed description and information on line of shovel-cranes. Photographs show five mobile truck-cranes, and some of the eighteen crawler-mounted and four self-propelled rubber-tired models which are described. Also covered is hydraulic power control feature.

Book 2577 is issued by Link-Belt Speeder Corp., Dept. CP, Cedar Rapids, Iowa. When inquiring specify 2510 on the convenient Reader Service slip opposite last page.

5 Features that give you EVERLASTING valve service

1
Straight through flow . . . minimum pressure drop.

2
Quick acting . . . opened and closed with less than one quarter turn of lever.

3
Self grinding rotating disc . . . assures tight seal.

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Non-wedging action . . . cannot jam . . . parts move between parallel faces.

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No lubrication required . . . hence no maintenance expense.

Our 50 years experience as valve manufacturers is at your disposal.

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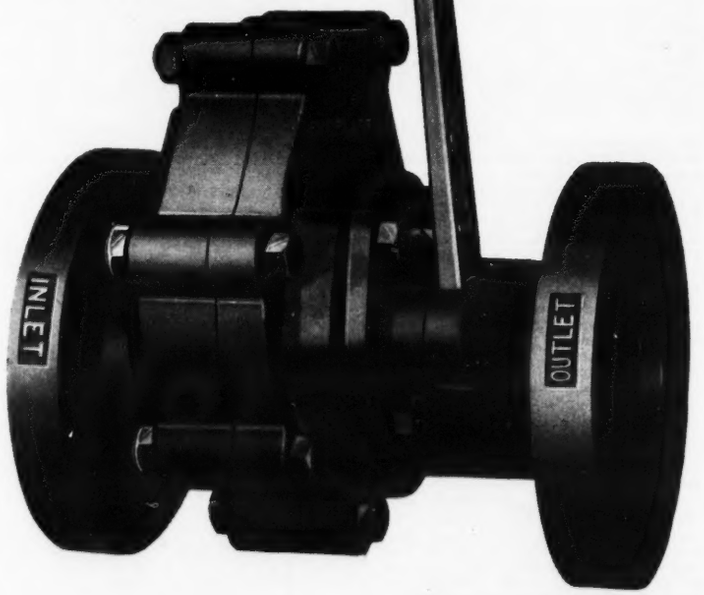

EVERLASTING Valves

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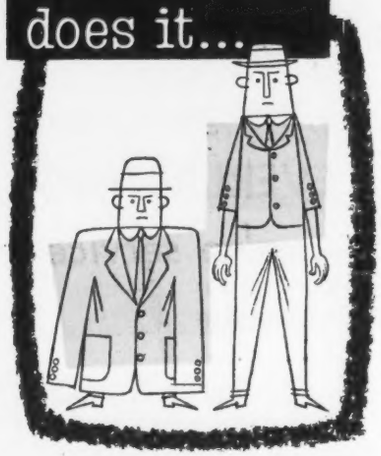
73 FISK STREET, JERSEY CITY 5, N. J.

EV-300

When inquiring check 2511 opposite last page

no one coat does it...



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PARAVAL ENAMEL. Not affected by acids, alkalies and other chemicals. Used on wood, metal, concrete or masonry. RUBBER BASE ENAMEL. Combines excellent exterior durability with high chemical resistance.

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SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

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M & F ENAMEL (General Maintenance), VALKOTE (Implement Enamel), DARYWHITE. Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

Write today on your regular letterhead for FREE catalog on all Valdura maintenance paints.

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When inquiring check 2512 opposite last page

NEW LITERATURE

Silicone products reference guide

Almost 150 silicone products are described in manufacturer's 12-page catalog. Products, grouped by usage, include water repellents, silicone rubber, dielectrics, paint vehicles, lubricants, fluids, and defoamers.

"Silicone products 1957" is issued by Dow Corning Corp., Dept. CP, Midland, Mich. Specify 2513 opposite last page.

Tells how aluminum jacketing materials, methods, cut costs

Information on aluminum insulation jacketing materials and methods is divided into three parts in 40-page manual. Part I tells how jacketing improves appearance, gives longer life, and reduces costs. Part II covers recommended materials and methods for pipe, vessel, and head jackets, fasteners, tank roofs, flashings, and others. Part III contains typical application specifications, corrosion resistance of aluminum alloys, tips on handling, jacketing computation tables, and properties of recommended alloys.

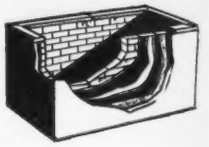
Manual on aluminum insulation jacketing materials and methods is available from Process Industries Dept., Kaiser Aluminum & Chemical Sales, Inc., Dept. CP, 919 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 2514 on the convenient Reader Service slip which is located opposite last page.

Idea submitted by Roy H. Bible, Jr., of G. D. Searle & Co., Chicago, Ill.

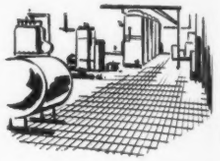
for COMPLETE CORROSION

Protection...

SPECIFY ATLAS

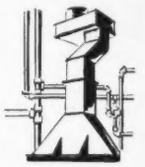


all types of chemical processing and storage tanks as well as other vessels for handling or holding corrosive solutions can be protected with Atlas Corrosion-Proof materials of construction.



industrial floors, pits, trenches and sumps can be constructed to resist attack from corrosive spillage and drainage of a wide range of acids, alkalies, solvents, salts, greases and detergents.

corrosion-resistant, self-supporting, plastic structures can be designed and fabricated to meet your specific needs . . . complete plastic pipe systems including flanges, valves and fittings are also available.



ATLAS MINERAL
PRODUCTS
MERTZTOWN, PENNSYLVANIA

Write for Bulletin CC-3 giving complete facts.

When inquiring check 2515 opposite last page

METALAB

for a VERSATILE LABORATORY

Outstanding features of METALAB Equipment:

- Fireproof, waterproof, corrosion resistant, rustproof.
- Exclusive 5-point METCOTE protection throughout.
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Since your laboratory is a "Testing-Ground" and a source of improved processes and products . . . it deserves the finest equipment. Our planning service is available without any cost or obligation.

Specify METALAB and you are assured of having equipment that is completely versatile, functional, and adaptable to future operational requirements.

The equipment shown here features entire units and illustrates METALAB precision engineered interchangeable type construction.

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Organization_____

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When inquiring check 2516 opposite last page

Physical, electrical data on epoxy resins

Fold-out chart, 11 × 21½", gives physical and electrical data on 27 formulated epoxy resin systems. Included are room-temp set, heat-cured, filled, unfilled, resilient, and rigid resins. Properties with different hardeners are given.

Epocast Resin Chart EP-56-49 is issued by Furane Plastics, Inc., Dept. CP, 4516 Brazil Street, Los Angeles 39, Calif. When inquiring check 2517 on the convenient Reader Service slip which is located opposite last page.

Describes pressure measurement with fluid pressure cells

Many industry applications of fluid pressure and load cells are covered in 20-page bulletin. Brief descriptions of load cell devices for tank, ore bucket, and railroad car weighing, and torque measurement are presented. Illustrations show various applications. Bulletin also describes fluid pressure cells for use where pressure measurements of gases or liquids are required.

Bul 4300 is issued by Baldwin-Lima-Hamilton Corp., Dept. CP, Philadelphia 42, Pa. When inquiring specify 2518 on form opp. last page.

Manufacturers of steel containers listed in directory

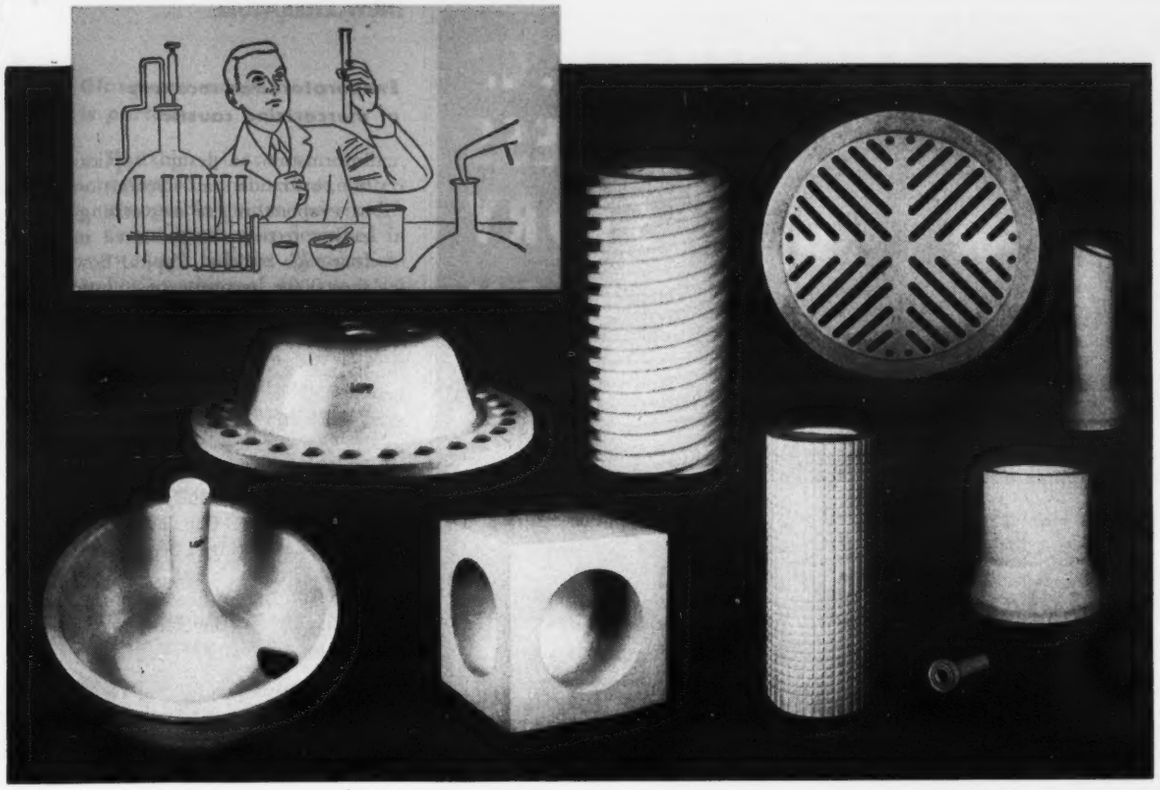
Addresses of steel-shipping-container manufacturers are listed in 32-page directory. Included are product-manufacturer cross-reference tables and general information on specifications, production figures and statistics, and story of research in field of linings and coatings.

1956-1957 Directory is issued by Steel Shipping Container Institute, Dept. CP, 600 Fifth Ave., New York 20, N.Y. When inquiring specify 2519 on form opposite last page.

Handy chart simplifies flowmeter selection

Revised eight-page bulletin has chart for rapid selection of proper flowmeter. Full range of sizes handles capacities up to 75,000 cfh of air. Cutaway drawing illustrates construction and operation. Photographs point out several applications.

Bul SC-1022 is issued by Selas Corporation of America, Dept. CP, Dresher, Pa. When inquiring specify 2520 on form which is located opposite last page.



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WITH LAPP CHEMICAL PORCELAIN

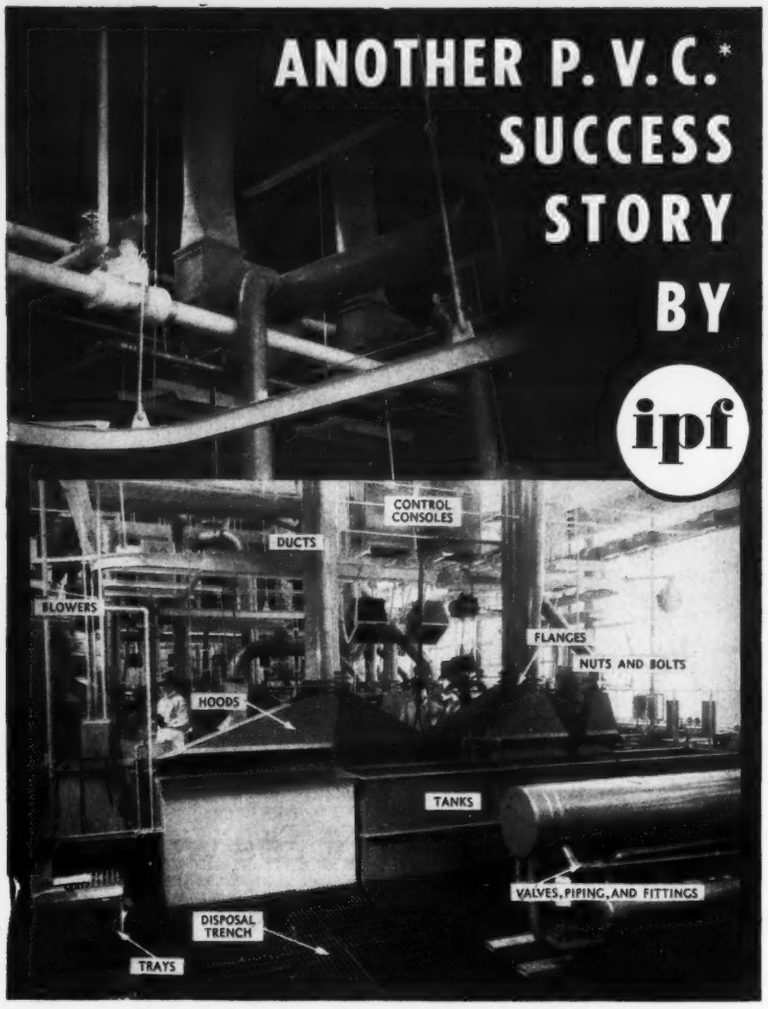
Don't sacrifice purity when putting a new process into production. There's no reason to search for substitute materials that *might* duplicate laboratory results . . . use the *same* materials in which the laboratory worked out the process. That's right! Porcelain, the world-wide standard for laboratory purity, is available in Lapp Chemical Porcelain equipment for pilot plant *and* industrial production. A wide variety of valve styles, pipe and fittings, towers and raschig rings and many special shapes, including custom pieces for your specific requirements, are available, and at costs much less initially than many types of special alloy or lined equipment. Lapp Porcelain is chemically inert, hence corrosion resistant—it usually requires no maintenance.

Where extreme care must be given to protection of product, plant or personnel against accident or carelessness, specify Lapp Chemical Porcelain with TUFCLAD Armor. TUFCLAD (multiple layers of heavy fiberglass fabric bonded with an Epoxy resin) serves as protection against impact, insulation against thermal shock, and is strong enough to hold line pressures even when porcelain is cracked or broken.

Lapp CHEMICAL PORCELAIN

WRITE ***for bulletin describing the characteristics of Lapp Chemical Porcelain. Lapp Insulator Company, Inc., Process Equipment Division, 825 Wendell St., Le Roy, New York.***

When inquiring check 2521 opposite last page



Scintilla Division of Bendix Aviation Reports Maintenance-Free P.V.C. Service

**Rigid Polyvinyl Chloride (P.V.C.) Fabrication by Industrial Plastic Fabricators — the new material of construction — is being used for 90% of the equipment at Scintilla Division's new Plating Rooms.*

These facilities, generally recognized as the most modern in the country, have used IPF Products without a single replacement.

Plating tanks . . . stands . . . exhaust systems . . . baskets and trays . . . and drainage troughs were a frequent source of interrupted production when corroded metal equipment needed replacement. Even costly rubber lining of the metal to protect against the acids and corroding fumes did not solve the problem. But — since Scintilla Division's conversion to P.V.C. — no replacements, no slowdowns, no lost time.

IPF blowers, hoods, tanks, ducts, piping systems, valves, nuts, and bolts, and machine parts can also solve your corrosion problems. P.V.C. is a lightweight, smooth surfaced, nonporous, plastic material. Its inherent anti-corrosive qualities insure long life — reduced maintenance costs.

Complete information on P.V.C., "the new material of construction" available upon request.

MANUFACTURED BY
industrial plastic fabricators, inc.
NORWOOD, MASS. NOrwood 7-3411

When inquiring check 2522 opposite last page

NEW LITERATURE

Evaporators for recovery of mercerizing caustic

Information on design, application, operation, and construction of evaporators for mercerizing-caustic recovery is presented in four-page bulletin. Typical flow sheets for recovery of caustic from pure mercerization, gray mercerization, and mercerization of yarn-dyed fabrics are illustrated. Bulletin also lists requirements necessary to determine solution to caustic evaporator problems.

Bul SW-201 is issued by Swenson Evaporator Company, Division of Whiting Corp., Dept. CP, 157th St. & Lathrop Ave., Harvey, Ill. When inquiring specify 2523 on form opposite last page.

Displays polyethylene laboratory ware

Illustrated catalog of 16 pages describes and prices complete line of polyethylene ware for laboratory. Several items are offered in high-heat polyethylene, withstanding temperatures to 250°F.

Bulletin P-965 is issued by the Scientific Glass Apparatus Co., Inc., Dept. CP, Bloomfield, New Jersey. When inquiring specify 2524 on form opp. last page.

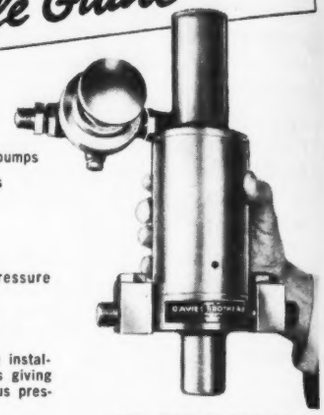
No conversion calculations with 8-scale manometer

Scales mounted on sides of eight-sided vertical drum can be rotated into reading position beside glass tube of manometer described in four-page catalog. Calibrations are in units such as psi, ft of altitude, or knots air speed. Manometer having heavy-gage steel case and tripod base is shown.

Catalog 2850 is issued by King Engineering Corp., Dept. CP, Box 640, Ann Arbor, Mich. Specify 2525 opposite last page.

8 reasons why you should switch to—

AIR-HYDRO-PUMP Jr. "The Little Giant" FOR PRESSURE TESTING 10,000 PSI (with air-100 psi)



1. Operates more quickly and efficiently than hand pumps
2. A turn of the wrist gives instant pressure.
3. Saves man hours.
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6. Ideal for testing valves and fittings.
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SIX JUNIOR MODELS 100 PSI TO 10,000 PSI
$185.00
F.O.B., N.Y.C.

Also Complete Range of 35 Standard Models, Single or Double Acting

DAVIES BROS. 120 WALL ST., N.Y. 5, N.Y.

When inquiring check 2526 opposite last page

FOR MAXIMUM SAFETY all over your plant use Safety **GRIP-STRUT**

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features
- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer — warm in winter

Big Economy Features
- ★ For balconies—no extra light needed below—no extra heat.
- ★ No extra supports necessary—channels are integral part of the material
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

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When inquiring check 2527 opposite last page

CORROSION YOUR BIG PROBLEM?

New 60-page booklet gives complete facts on

REPUBLIC ELECTRUNITE®

STAINLESS STEEL TUBING & PIPE

- ANALYSES
- APPLICATIONS
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Write for Booklet STP-1

Protect your electrical wiring in highly corrosive locations with Republic "Dekoron®-Coated" E.M.T. Booklet DEK-3 tells how. Write for it.

REPUBLIC STEEL

STEEL AND TUBES DIVISION

207 East 131st Street • Cleveland 8, Ohio

When inquiring check 2528 opposite last page

ACCURATE

PORTABLE

Alnor®

PYROMETER

TYPE 1500

Checking temperatures of electric heating mantles is but one of the many laboratory temperature jobs performed with consistent accuracy within ¾ of 1% full scale—under all conditions.

Sturdy case protects precision meter movement in portable use. Direct reading scale face can be quickly read at distance—no slide wires or conversion tables needed. Available in ten scale ranges from 0-400° to 0-3000° F. or centigrade equivalents.

Get full details on the Type 1500 in Bulletin 4434. Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check 2529 opposite last page

Glassware washer is portable

Portable glassware washer, equipped with three interchangeable guides and six different brushes, is described in two-page bulletin. "Production-line" washing of 1000 to 1500 test tubes or 1000 to 1100 bottles per hour is cited.

"Portable Glassware Washer" is isued by Arthur S. LaPine and Co., Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. When inquiring specify 2530 on form opposite last page.

Gas chromatography and its story

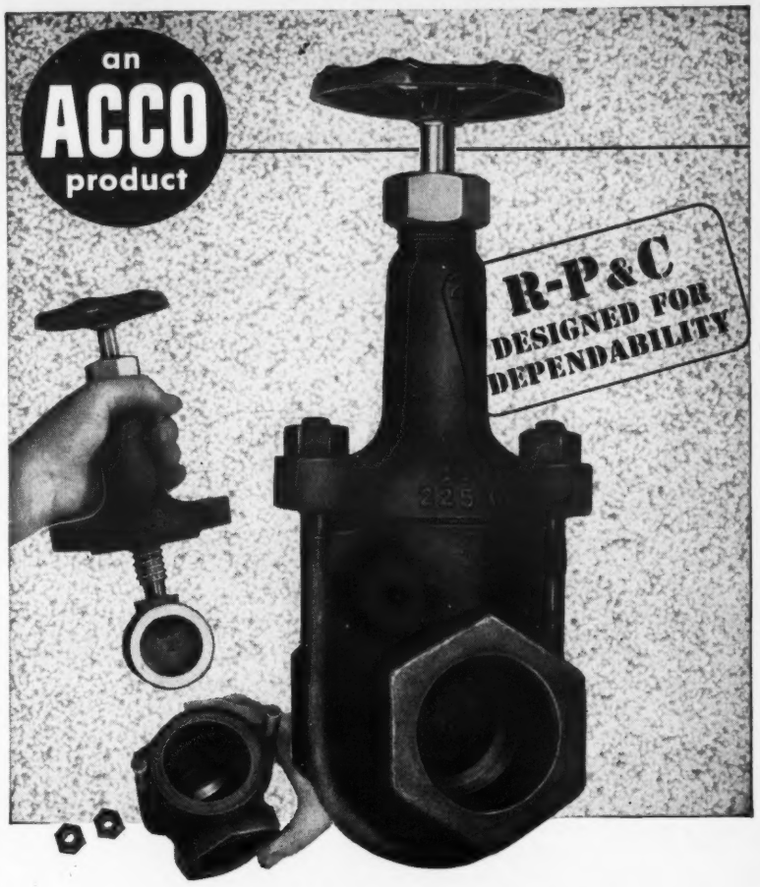
Article tracing historical background, theory, practice, and potentialities of gas chromatography is presented in four-page booklet.

"Hot Air Unlimited" may be obtained from Dr. Murray Berdick, Coordinator of Research, Evans Research and Development Corp., Dept. CP, 250 E. 43rd St., New York 17, N. Y. When inquiring specify 2531 on the convenient Reader Service slip which is located opposite last page.

Ultrasonic components, systems featured

Products and achievements of company are reviewed in 16-page catalog which enumerates divisions, and pictures and describes products of each. Development and production of electro-mechanical, electro-acoustical and electronic devices, instruments, transducers and complete systems are covered.

"Products and Achievements" is issued by Gulton Industries, Inc., Dept. CP, 212 Durham Ave., Metuchen, N. J. When inquiring specify 2532 on the convenient Reader Service slip opposite last page.



for Easier Cleaning!

—R-P&C IRON BODY CLIP GATE VALVES

• R-P&C clip gates were developed specially for those applications in the chemical and petroleum industries where ease of cleaning is a big factor. With these rugged valves you simply remove two nuts, then lift up the bonnet, stem and gate assembly in one piece for easy access to the entire valve body.

Ease of maintenance and sturdy construction make these clip gates preferable over bronze gate valves in many applications. Rated for 150 lbs. steam, or 225 lbs. OWG, clip gates are furnished in sizes from ¼" to 3", with screwed ends. Normally furnished with bronze trim, they may also be supplied in all-iron for use with fluids which attack bronze.

All castings used are of close-grain, hi-test gray iron, 50% stronger than ordinary iron, from R-P&C's own foundry. Their construction embodies quality features that are characteristic of R-P&C's complete line of gate, globe, angle and check valves in all of the standard valve materials.

FREE SLIDE RULE

Valve selector slide rule gives all dimensions for iron body and steel valves in pressure classes from 150 to 1500 lbs. Write for yours.

See your R-P&C Distributor or write for catalog

ACCO

TRADE MARK

R-P&C Valve Division

AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

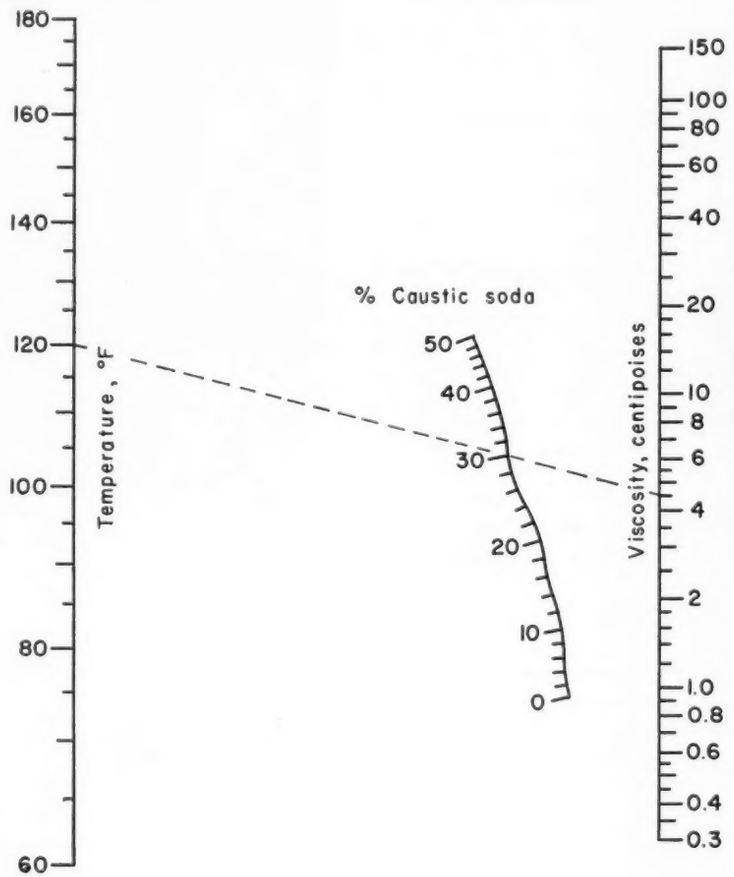
R-P&C valves

When inquiring check 2533 opposite last page

Viscosity of Caustic Soda Solutions

D. S. DAVIS
Professor of Chemical Engineering,
University of Alabama

Determination of viscosities of caustic soda solutions at various temperatures will be facilitated through the use of this nomograph. Chart is constructed from already-published data[2] by means of predescribed methods[1].



Typical Example

The broken line shows that the viscosity of 30 percent caustic soda solution is 4.6 centipoises at 120°F.

LITERATURE CITED

1) Davis, D. S., "Nomography and Empirical Equations," Chap. 10, Reinhold, New York (1955).
2) Hooker Electrochemical Co., "Caustic Soda," *Technical Service Bulletin 102*, p 21, Niagara Falls, N. Y. (1956).

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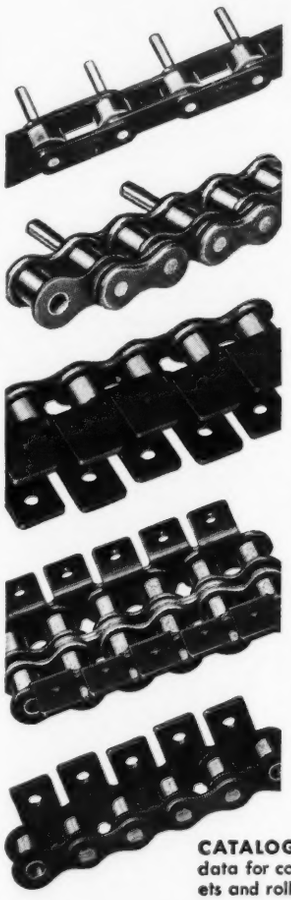
good answers
to Conveying, Sorting, Packaging, Handling, Timing Problems



• Standard Diamond Roller Chain is available in pitches from ¼" to 2½" with pins extending every pitch, every second pitch or as required. Double pitch chain with standard or large rollers for rolling over flat surfaces (illustrated) can be furnished with pins extending as desired.

• Double bent attachments can be furnished one side, or both sides of chain every link, or spaced as required for your particular operation.

• Bent attachments both sides of double strand Diamond Roller Chain provide excellent carrying capacity and improved stability for heavier products or materials which may have unequal weight distribution.

• Straight attachments every pitch for mounting fixtures, parallel cross members or other conveyor accessories. Straight attachments can be ordered spaced as required and on one or both sides of chain.

CATALOG 754 contains engineering data for correct selection of stock sprockets and roller chain. Write for your copy.

DIAMOND CHAIN COMPANY, Inc.
Where High Quality is Traditional
Dept. 411, 402 Kentucky Avenue, Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities
Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS

When inquiring check 2534 opposite last page

Wanted: Nomographs!

Each could earn $20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

CHEMICAL PROCESSING pays $20 for each one accepted and published.

Cobalt molybdenum catalysts

Details of how a cobalt molybdenum catalyst upgrades a wide mw range of petroleum stocks by hydrogen treating are presented in six-page folder. In addition to giving significant features, performance characteristics, and physical properties of the catalyst, details of hydrogen treating of naphthas, middle distillates, heavy gas oils, and heavy oils are given. Typical reactions and flow diagrams are included.

"G-35 Co-Mo Catalyst" is issued by The Girdler Co., Catalyst Department, a Div. of the National Cylinder Gas Co., Dept. CP, Louisville 1, Ky. Specify 2535 opposite last page.

Catalogs twenty organics

Twenty organic chemicals — ethylene oxide and dichloride, eight glycols, five suface-active agents, mono-, di-, and triethanolamines, morpholine, and nonyl phenol — are cataloged in 8-page bulletin. Specifications, descriptions, and uses are given.

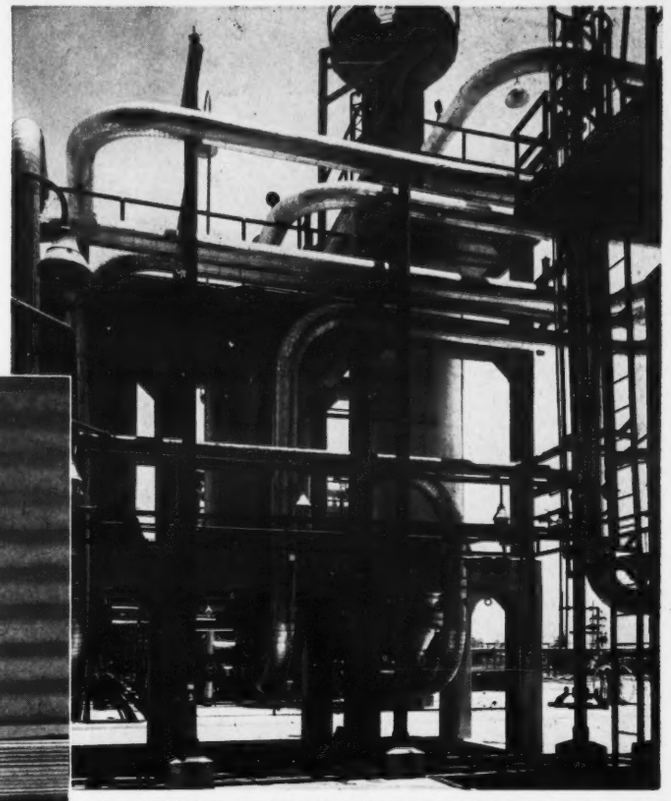
"1956 Chemicals" is issued by Jefferson Chemical Co., Dept. CP, Houston 25, Texas. When inquiring check 2536 on form which is located opposite last page.

Tells facts about man-made rubber

Information on physical properties and processing of man-made "natural" rubber, including step-by-step pictures of production process, is contained in 26-page booklet. Charts give analysis of properties of "cold" non-oil polymers, "cold" oil-extended polymers, and "hot" polymers. Test recipes and test data are also included. "Ameripol Rubber" is issued by Goodrich-Gulf Chemicals, Inc., Dept. CP, 3121 Euclid Ave., Cleveland 15, Ohio. When inquiring specify 2537 on form opposite last page.

CHILDERS JACKETING

Protects Your Insulation Investment



EASILY INSTALLED with only a screwdriver and a wedge. Inexpensive strapping holds Childers Jacketing securely, yet permits easy removal for inspection of the lines. Same jacketing can then be reapplied without waste.

...safeguards insulation on process lines in thousands of refineries and chemical plants

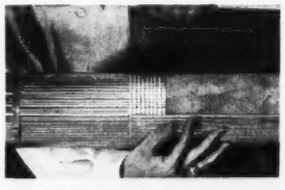
It's a fact that you benefit from world-wide experience when you protect costly insulation on lines, towers, vessels and tanks with Childers Aluminum Jacketing. More than 2,000 petroleum refining, petrochemical and chemical plants endorse your decision to use Childers Jacketing.

Childers' experience in protecting insulation has provided the most complete line of permanent-type weatherproofing offered today. Five weights of aluminum are available. In addition, time-saving Lap Seal (patent pending), factory-attached moisture barrier and rolled-in cross-corrugation give superior protection and reduce costs.

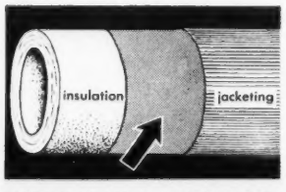
The initial cost is lower for Childers Jacketing than any other permanent weatherproofing . . . even lower than some temporary coverings. But the biggest savings are in the maintenance-free years following installation. Costly insulation is effectively protected against weather damage and physical abuse.

Improved appearance of your plant and easier "housekeeping" are "plus" benefits of Childers Aluminum Jacketing.

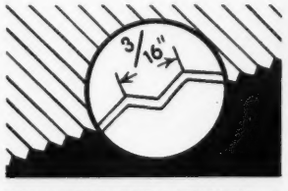
Childers Engineering Representatives give professional advice on insulation jacketing in all major industrial centers. Send for a **free sample** of jacketing, engineering data on how to safeguard your insulation and the name of the Childers Engineering Representative near you. Write Childers Manufacturing Co., Dept. CP-13, P. O. Box 7467, Houston 8, Texas.



LAP SEAL, available at no extra cost, is a series of 8 ribs rolled into the underlapping edge of the jacketing, providing an automatic measure of the 2" circumferential lap. Proper lap is insured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap Seal and a mastic.



FACTORY-ATTACHED MOISTURE BARRIER protects the underside of aluminum from possible attack by alkaline solutions present in most insulating materials. The moisture barrier, bonded at the factory by continuous strip adhesive, adds little to cost, saves application labor, insures against underneath corrosion.



TESTS PROVE EXTRA STRENGTH of rolled-in 3/16" cross corrugation. Vertical strength and rigidity of a .016" sheet with this 3/16" cross corrugation are increased to that of a plain .024" sheet. Jacketing costs are consequently reduced by as much as 1/3 when Childers Jacketing is used instead of ordinary sheet aluminum.

DEEP CORRUGATED Childers Jacketing in 1¼" and 2½" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels and tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.

When inquiring check 2538 opposite last page

Sewage Treatment

D. S. DAVIS
Professor of Chemical Engineering
University of Alabama

Although sewage treatment cannot be considered an exact science, it is possible to get some idea of the expected performance of a single-stage bio-filtration plant employing a high-rate trickling filter. This nomograph allows quick estimation of the biochemical oxygen demand (BOD) in settled filter effluent. It is based upon the equation:

$$L_e = \frac{L_a}{2R+3}$$

where,

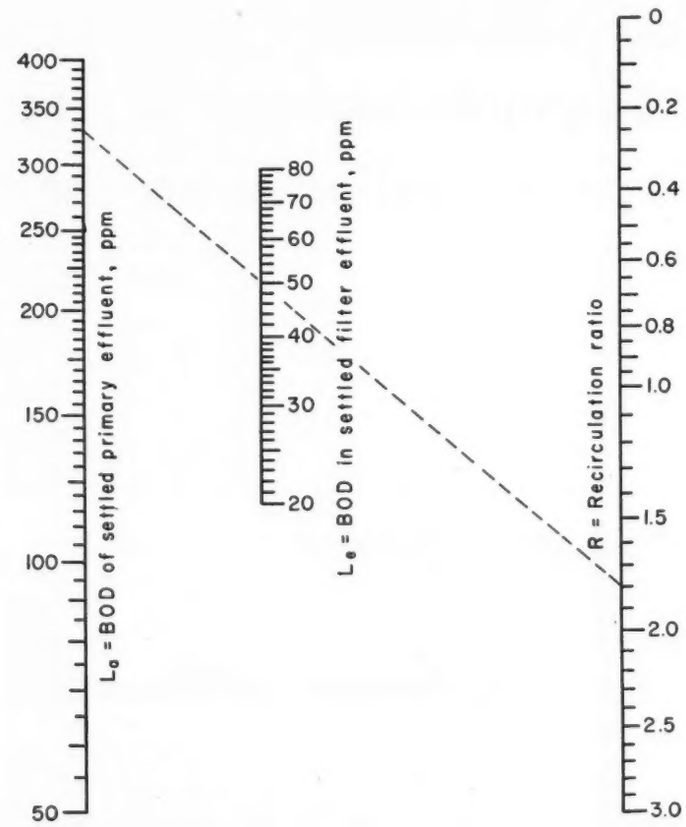
L_e = BOD of settled filter effluent, ppm
L_a = BOD of settled raw sewage, ppm
R = ratio of recirculated flow to raw sewage flow

Typical Example

To find the BOD in settled filter effluent when the recirculation ratio is 1.8 and the BOD of settled primary effluent is 330 ppm, connect 1.8 on the R scale to 330 ppm on the L_a scale. Intersection with the L_e scale indicates BOD of 50 ppm.

LITERATURE CITED

1) McCabe, J., and Eckenfelder, W. W., "Biological Treatment of Sewage and Industrial Wastes," Vol 1, Aerobic Oxidation, p 308, Reinhold, New York (1956).



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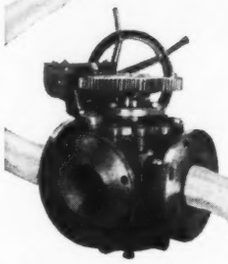
USE Jacketed PLUG VALVES



for
- Asphalt
- Pitch
- Tar
- Sulphur
- Varnish
- Waxes
- Heavy Oils
- Chocolate
- Phthalic Anhydride
- Viscous Materials

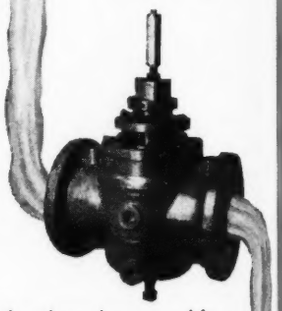
and heat with Steam, Hot Oil, Dowtherm, Hot Water

Sizes
1¼" x 2" to 8" x 10"

Types
2 and 3 way
Lubricated
Non-Lubricated

Materials
In stock—Semi-Steel
On order—Ni-Resist Ductile Iron, Steel, Stainless Steel

Operation
Standard—Wrench
On order—Gear, Air, Hydraulic



These jacketed plug valves have been used for over 30 years in service where reliable operation is demanded and extremes of operating conditions must be met. Heavier than standard flanges provide ample strength for highly stressed bolting and rough handling.

All valves are provided with a thrust ball screw adjustment under the plug to regulate seating. The screw is also used as a jack to free plug during disassembly.

Shipment
Stock on most sizes and types in Semi-Steel

Write for Complete Catalog

Parks-Cramer Company
PROCESS HEATING DEPARTMENT
FITCHBURG 4, MASSACHUSETTS

When inquiring check 2539 opposite last page

Positive-displacement pumps described in detailed bulletin

A multiple-section bulletin of 62 pages presents a comprehensive story on company's positive-displacement pumps for the chemical, food, and brewing industries. Design features, capacities, drives, and materials of construction are given. Use of Kel-F, O-ring seals is explained.

Bul 1957 is available from Waukesha Foundry Co., Dept. CP, Waukesha, Wis. When inquiring specify 2540 on form opposite last page.

Details company's full line of alkalis and chemicals

Informative data on uses, markets, physical and chemical properties, packaging, handling and storage of company's full line of alkalis and chemicals are contained in digest-size 67-page book. Listing groups products according to consuming industries or manufacturing processes. Photographs show various plant facilities and operations.

"Products Book" is issued by Solvay Process Div., Allied Chemical & Dye Corp., Dept. CP, 61 Broadway, New York 6, N.Y. When inquiring specify 2541 opposite last page.

Electric membrane method of demineralization

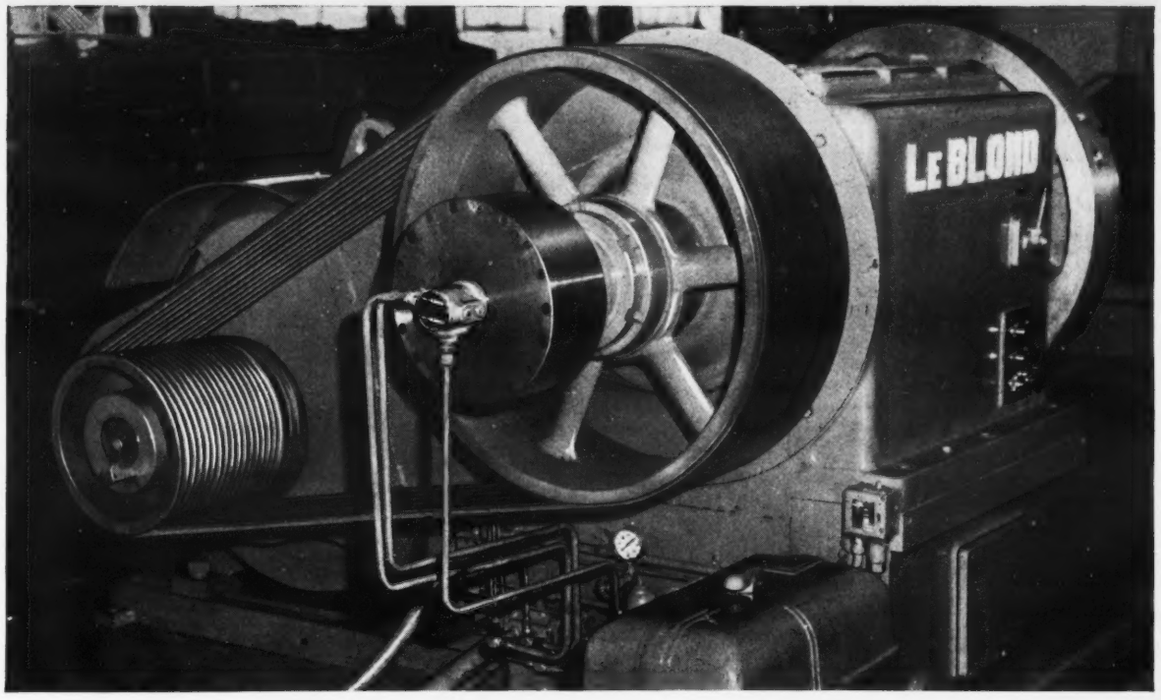
Bulletin of 20 pages describes basic principles of electric membrane method of demineralization. Design, performance, and cost data for various size units are provided. Units range in capacity from 2500 to two million gallons of demineralized water daily, using input water containing from 1000 to 10,000 ppm of total dissolved solids.

Bul 3 is issued by Ionics, Inc., Dept. CP, 152 Sixth St., Cambridge 42, Mass. When inquiring specify 2542 opposite last page.

Gives simulated sand float finish for dry wall construction at low cost

Six-page bulletin tells how to use latex paints based on EVT-50 to give a one-coat, simulated sand float finish on new dry wall construction. Two suggested formulations are given.

Supplement #3 to EVT-50 bul is issued by Cargill, Inc., Dept. CP, PO Box 1075, Pittsburgh 30, Pa. When inquiring check 2543 on form opposite last page.



NEW R/M *Poly-V®* Drive
Solves Seven Major Power Transmission Problems!

Heavy duty drive problems can be accepted as necessary and costly features of power driven equipment—or they can be overcome! The difference is Poly-V* Drive . . . R/M's patented new concept in heavy duty power transmission. Here's how R/M Poly-V Drive helps eliminate seven major problems common to most conventional V-belt drive applications.

BELT MATCHING—Poly-V employs a single unit, V-ribbed endless belt running on specially designed sheaves—not a series of V-belts which vary in length. Belt length matching problems are completely eliminated!

SPEED RATIOS—Full contact between belt ribs and sheave grooves prevents belt "sinking" and uneven speeds . . . maintains constant speed ratios and effective pitch diameter from *no* load to *full* load!

SPACE REQUIREMENTS—Greater horsepower capacity per inch of sheave width with Poly-V delivers up to 50% more power in the *same* space as a multiple V-belt drive . . . or *equal* power in as little as ⅔ the space!

DRIVE LIFE—Poly-V Drive has *twice* the contact area with only *half* the face pressure and that means *less* wear, *longer* life for both belt *and* sheaves!

STOCK INVENTORIES—Just *two* cross sections of Poly-V Belt meet *every* heavy duty power transmission requirement, as compared to *five* in the case of V-belts. With Poly-V you keep belt and sheave inventories to an all time low!

HEAT PROBLEMS—Because thinner Poly-V Belts have twice the ribbed area of V-belts exposed to the air, you are assured *cooler* operation and less strain on your equipment. And, of course, Poly-V Belt construction is heat resistant, oil-proof and non-spark!

EQUIPMENT DOWNTIME—Stronger, cooler running, longer lasting Poly-V Belt needs fewer tension adjustments after run-in . . . stays on the job longer to reduce downtime costs for replacements, too!

If any—or *all*—of these features can help improve your heavy duty power transmission drive performance and dependability, you owe it to yourself to investigate R/M Poly-V Drive. R/M engineers who developed it will be glad to assist you in determining the Poly-V Drive installation that will best solve your problems . . . give you "More Use per Dollar."

**Poly-V is a registered Raybestos-Manhattan trademark.*

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When inquiring check 2544 opposite last page

Trimethylene Glycol in Glycerol

D. S. DAVIS
Professor of Chemical Engineering,
University of Alabama

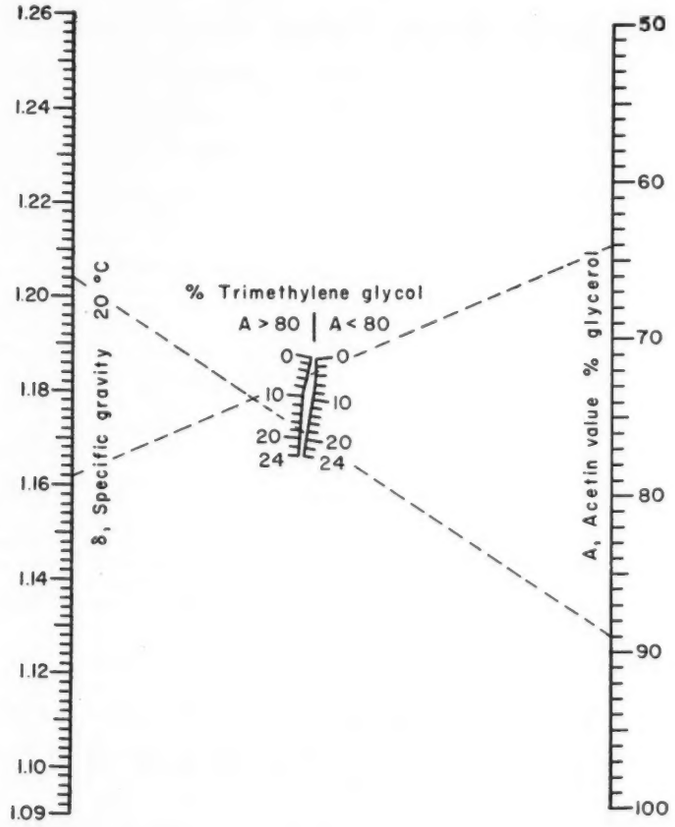
The content of trimethylene glycol in crude glycerol can be estimated when the specific gravity of the crude glycerol at 20°C/20°C and the acetin value in percent glycerol is known. This nomograph which is based upon tables[3] derived from a reliable method for estimating the amount of trimethylene glycol was constructed by means of well-known procedures[2].

Typical Examples

What is the content of trimethylene glycol when the acetin value is under 80 percent? The crude glycerol has specific gravity of 1.162 and acetin value is 64%. Connecting 1.162 on the δ-scale with 64 on A-scale (as shown by broken line) gives a reading of 3% (scale for A<80). What is the content of trimethylene glycol when the acetin value is over 80 percent? With a specific gravity of 1.204 and acetin value of 89, broken line intersects center scale (A>80) for a reading of 18%.

LITERATURE CITED

1) Cocks and Salway, *J. Soc. Chem. Ind.*, *41*, 17-20, 32T (1922).
2) Davis, D. S., "Nomography and Empirical Equations," Chap 10, Reinhold Publishing Corp., New York (1955).
3) Miner, C. S., and Dalton, N. N., "Glycerol," p 221, Reinhold, New York (1953).



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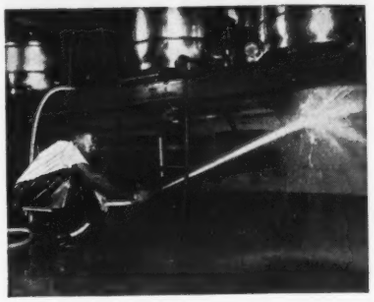
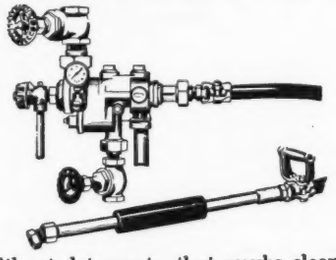


ELIMINATE DIRTY WORK

Until recently, there was no real substitute for hand scrubbing on tough cleanup jobs. Nobody liked it.

Now, scrubbing action can be provided hydraulically. It's better, faster and a thousand times cheaper than any hand method.

The Sellers Hydraulic Jet Cleaner uses only cold water and steam (as low as 5 psi.). It delivers a high temperature, high impact jet, with or



without detergents, that scrubs clean any surface. It sweeps floors, conveyors, processing machinery free of all types of foreign matter . . . cleans hard-to-reach spots without dismantling equipment.

There's no comparable cleaning action provided by any cleaning device, no matter what cost. The Sellers Hydraulic Jet is easily installed . . . simple to operate.

GET THE FACTS . . . *send for Bulletin 424.*

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Data bulletin on ethylene oxide includes vast bibliography

Analytical procedures, physical and chemical properties, and industrial uses of ethylene oxide are in 44-page technical bulletin. Along with ten graphs of physical properties, data are included on handling techniques and toxicity, as well as specifications. Bibliography listing 489 references is also given.

"Ethylene Oxide" is issued by Jefferson Chemical Co., Inc., Dept. CP, PO Box 303, Houston 1, Texas. When inquiring specify 2546 on form opposite last page.

Test results on exterior paints containing acrylic emulsion

Detailed information on various exterior paint formulations containing acrylic emulsion is tabulated in 48-page report. Tests were made on experimental paints designed to permit study of variables which affect outdoor durability. Report gives summary of conclusions in tests regarding chalking, dirt pick-up, whiteness and color retention, mildew and mold, erosion, cracking and flaking, extenders, and effect of substrate. Tables illustrate specific factors such as resistance to staining by metal or effect of substrate on durability.

Progress Report 3 is issued by Rohm & Haas Company, Dept. CP, 712 Locust St., Philadelphia 5, Pa. When inquiring specify 2547 on form opposite last page.

Service report discusses cleaning in chemical industry

Manufacturer's service report covers basic survey of cleaning requirements and procedures in chemical industry. Report discusses nature of soils usually encountered in chemical processing equipment, and recommends compounds developed to remove them. Up-to-date cleaning methods such as in-place chemical circulation, tank-soak, and steam-detergent cleaning, along with equipment designed for mechanized cleaning, are described. Time-saving methods for cleansing operations on processing towers, heat exchangers, storage tanks, tank trucks, etc. are shown. Company's research facilities and technical services are pointed out.

Service Report B-6039 is issued by Oakite Products, Inc., Dept. CP, 157 Rector St., New York 6, N. Y. When inquiring specify 2548 on the convenient Reader Service slip which is located opposite last page.

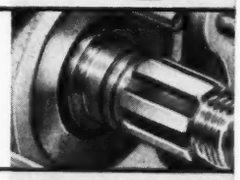
You Buy the DEPENDABILITY of a Quarter Century's Experience in WAUKESHA P. D.* Corrosive Resistant Pumps

● WAUKESHA today offers you the most Sanitary pump with the highest industry-proved performance of any in the field. Only WAUKESHA forges ahead with 18 new and important features. Heavier shaft construction . . . the Twin O-Ring Seal that positively prevents product leakage or intake of air . . . new reversible, stainless steel sleeve to save shaft wear . . . force-feed lubrication of heavy duty ball bearings are but a few.

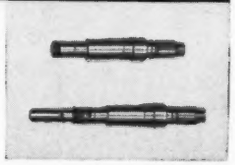
1957

. . . But you BUY A PLUS when you buy WAUKESHA

NEW! Reusable pump head gasket provides absolute seal at all vacuums, eliminates costly, troublesome paper gaskets.



Shaft sleeve seal O-Ring is located below the stainless steel sleeve, assures exact, precision positioning of the impeller.



Shafts of larger diameter with more and huskier splines provide flex-free operation and rigidity of the impellers.

*Positive Displacement

You are buying a quarter century of top engineering experience from the pioneer of the Sanitary Positive Pump. During that quarter century WAUKESHA has developed and pioneered every important improvement. Those are vital reasons why "Waukesha Is Another Word For Dependability."

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Dept. No. P-3 WAUKESHA, WISCONSIN

When inquiring check 2549 opposite last page

192

Dissolved Oxygen in Sewage

D. S. DAVIS
Professor of Chemical Engineering,
University of Alabama

Dissolved oxygen in sewage and other waters is determined by a modification[3] of the standard Winkler method[2]. A portion of the sample prepared for analysis by the Winkler method is poured into a ¾-inch test tube which is then inserted in a colorimeter calibrated at 450 millimicrons. The percentage transmittance y of the turbid, iodine-colored solution is read. The iodine color is destroyed with one drop of 10N sodium thiosulfate solution and the percentage transmittance of the colorless, turbid solution is read.

The concentration of dissolved oxygen, in parts per million, and y are related by the expression

$$\log y = a + bx$$

where a and b depend upon the transmittance of the colorless, turbid solution. This equation is solved in the accompanying nomograph, constructed by familiar methods[1].

Typical Example

What is the concentration of dissolved oxygen in sewage when the percentage transmittances of the colored and colorless solutions are 25 and 65, respectively? Connect 25 on the y-scale and 65 on the central scale with a straight line and read the desired concentration of oxygen on the x-scale as 5.0 parts per million.

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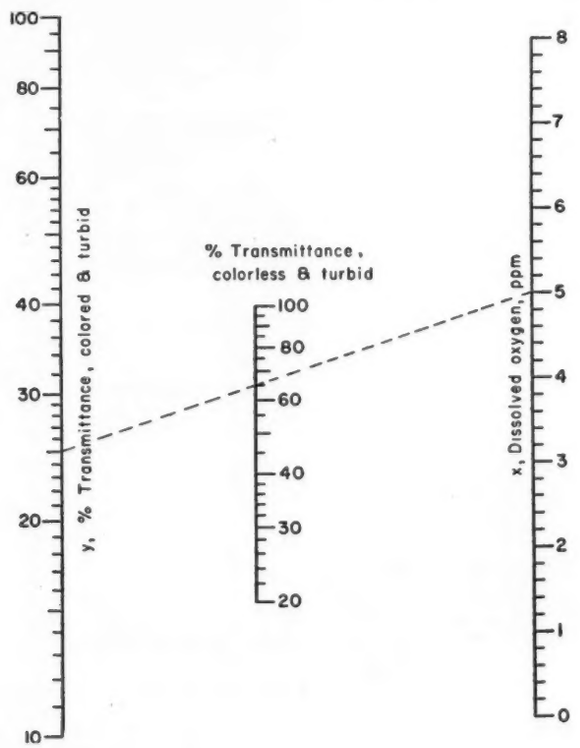
1) DAVIS, D. S., "Nomography and Empirical Equations," Chap. 10, Reinhold Publishing Corp., New York (1955).
2) "Standard Methods for the Examination of Water, Sewage, and Industrial Wastes," 10th ed., Amer. Pub. Health Assn., New York (1955).
3) OULMAN, C. S., AND BAUMANN, E. R., *Sewage and Industrial Wastes,* Vol. 28 No. 12 p 1461, (1956).



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What's a "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem.

In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem *was solved* . . . shows results secured.

Take a look at "New Solutions" articles in this issue— they might suggest a "solution" for some of your tough processing problems.

Train from Top Down

(Continued from page 9)

". . . we feel it essential that each management man realize that one of his most important responsibilities is to develop each man under him to do as good or better job than he can."

best within the broad category of human relationships. These included communications, discipline, grievances, orienting and training new people, union relations and union contract interpretation, analyzing and understanding the employes who work for a supervisor, and safety.

As a result of discussions in these areas, supervisors acquired a greater knowledge of supervisory jobs, departmental functions and plant operation and at the same time we believe have become more creative, resourceful, and self-reliant. The program covering these areas is being continued for all first line supervisors so that each new foreman has the opportunity to benefit from the program and grow into his job with as much help as possible.

The Next Step

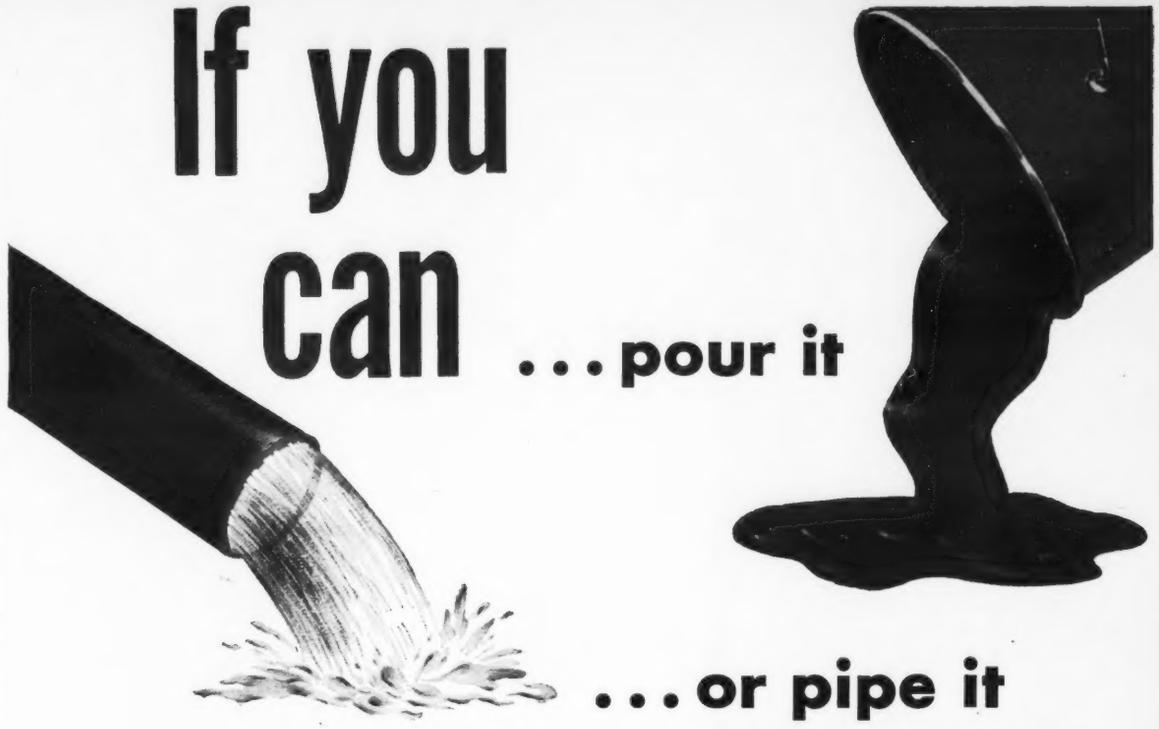
In 1955, when most of our supervisors had been through this program, we believed they were ready for the next step and that all supervisors above the foreman levels would benefit from a program which attempted to go right to the heart of the problem . . . the development of each man by the supervisor above him.

Since we believe that management development essentially is a process of development from the top down, we feel it essential that each management man realize that one of his most important responsibilities is to develop each man under him to do as good or better a job than he can. This means emphasizing the real role of on-the-job training.

We recognized that any training or development which may go on in the conference room but may not be carried out in the field was more frustrat-

(Please turn to next page)

If you can . . . pour it



. . . or pipe it

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including corrosive liquids

Did you know that your company can save important money by using modern measurement methods in handling industrial liquids? With Rockwell meters you can batch, blend and control formulas with precision. You can guard your costly liquid inventories. You can control costs. And with Rockwell automatic quantity control valves you can save time and money on repetitive operations.

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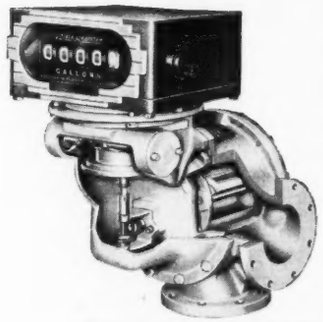

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Cutaway to show the all-revolving rotor construction

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Working Pressure _____ psi Temperature _____ °F max.
Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm
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Askania Regulator Company NEWS

Automatic Controls for
PRESSURE, FLOW and COMBUSTION

USEFUL NEW BULLETIN

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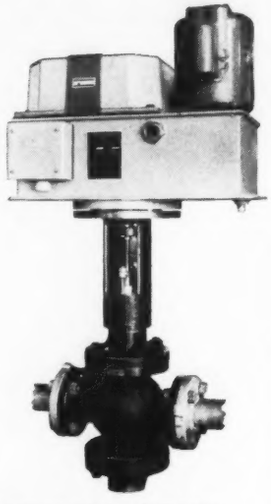
Describes and illustrates
UNIQUE
Final Control Element



The new Askania Electro-Hydraulic Valve Actuator which makes possible electric operation of the final control element.

Here's a well illustrated informative bulletin with ample facts, photos and drawings to show you the advantages of an all electric control system using this unique valve actuator.

Bulletin #38.2 contains the type of information you'll want at your fingertips—such as:

Valve Stem Speed • Valve Stem Thrust • Input Coil Resistance • Power Supply Requirements • Frequency Response • Weight • Oil Capacity •

Facts you'll want to know

Bulletin #38.2 explains that the ASKANIA *Electro-Hydraulic Valve Actuator can be:*

1 Adapted to any electronic controller with d-c signal output

2 Applied to any valve up to 8 inches in size and with strokes ranging from ½ inch to 2 inches

3 Adjusted to provide the proper setting for the desired valve stroke

4 Supplied with or without the valve

Be Informed—

Write for your copy of Askania Application Bulletin No. 38.2 Regardless of your present needs, you'll want to know about this novel FINAL CONTROL element. Just write Askania Regulator Company, 242 E. Ontario, Chicago 11, Ill.

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"CONTROLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

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Train from Top Down

(Continued from preceding page)

". . . we want to encourage all the potential of a man, help him to do a much better job in his present position today than yesterday and provide the opportunity for him to use more of his real abilities than he has been using."

ing than helpful. A man who can talk or even understand good management principles but who is not supervised along those lines will not be able to do a very good management job. In fact, that kind of training situation may do more harm than good. Hence the training must go in the *down* rather than *up* direction.

In this new phase of the program we want to encourage all the potential of a man, help him to do a much better job in his present position today than yesterday, and provide the opportunity for a way to use more of his real abilities than he has been using. If our program can accomplish these objectives, our people will get to a point where they are using a major portion of their abilities and have a greater job satisfaction.

In the development of such a program we looked for ways to help all supervisory people from the top down to work more closely with their men, to understand them better, to help their men by frequent sympathetic discussions about performance, to delegate duties and responsibilities wisely without abdication, to develop an attitude of coaching and encouragement, not criticism in the sense of a judge, and to develop successors as a prerequisite to promotion.

We are emphasizing that this problem of developing men is a line responsibility. Every supervisor is really his own director of training so far as responsibility for the job is concerned. Of course, supervisors should be able to obtain aid and counsel from the staff who are responsible for the quality of their advice.

Four basic steps have been incorporated in the program as a means to achieve these goals.

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presents
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DIAL THERMOMETERS

Direct Drive
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external calibration
Full 3½" Dial Face

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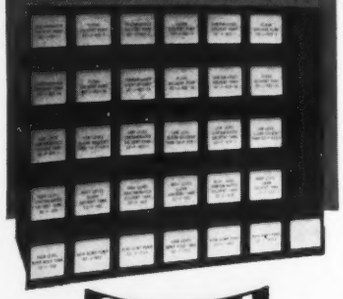

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First, each supervisor prepares a written record of the essential duties included in the job, in other words, a job description. When this is completed all supervisors discuss these descriptions in conference groups. This practice helps men to clarify with the immediate supervisor any misunderstandings they may have. Finally, the immediate supervisor approves the description after any problems have been resolved. The result is that areas of responsibility, authority and accountability are spelled out, rather than existing in vague terms of one thing today and another tomorrow. A written record of the job makes it an easy reference for checking activities. In case of promotion or job changes the description serves as a blueprint for training. Any changes in job requirements can be easily incorporated in the proper sequence in relation to other functions. One of the most important functions of the job description is that it provides a definite basis on which to base an appraisal of a man's performance.

The second step is the performance appraisal. Line supervisors have always said that they were constantly appraising performance and of course this is true. But most supervisors welcomed an opportunity to study the elements of appraising and felt they could improve their skill if a uniform procedure were developed. We found them very receptive to the opportunity of participating in conference discussions covering the appraising function. These discussions pointed up what a vital place the job of performance appraisal held in the daily management function. They also recognized it was nothing they could ask others to do for them. Of all the steps in the training of men, appraisal is one which is necessarily a line responsibility.

After appraisal what are we to do about it? Sometimes there is a good bit of variation in what is done and how it is carried out. Many supervisors realize it is not easy to talk to a man about his performance. If performance is good, how should it be presented? If performance is not good, what factors must be considered as to the type of person, timing, method of discussion, etc?

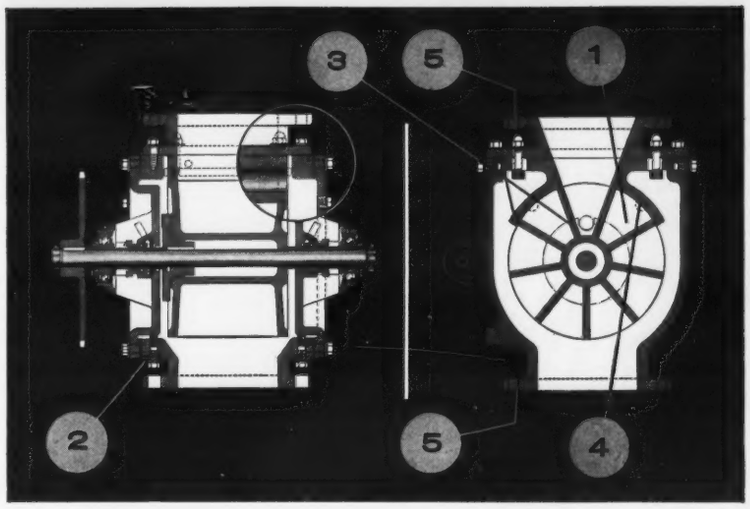
This brings us to the third step in the program — post appraisal interview — which can be one of the best training aids for stimulating self-development. In reviewing this function in conference discussions the thinking has developed along the following lines:

A man obtains the most important part of his job direction and training from his supervisor.

Every employe expects guidance from his supervisor and an indication of how well performance standards are being met.

Supervisors really want to acquire the skill and opportunity to counsel with their people on job performance because they understand it as an important facet in doing their own jobs.

(Please turn to next page)



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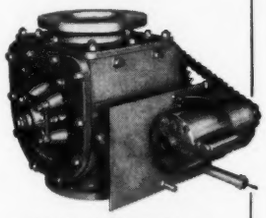

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Train from Top Down

(*Continued from preceding page*)

A well-conducted review of performance is one of the best methods to assure improved departmental performance.

Regular discussion of performance avoids misunderstandings and possible conflicts.

A two-way channel of communication is fostered in all work-relationships.

The immediate supervisor enjoys substantial personal satisfaction in seeing men improve under his guidance.

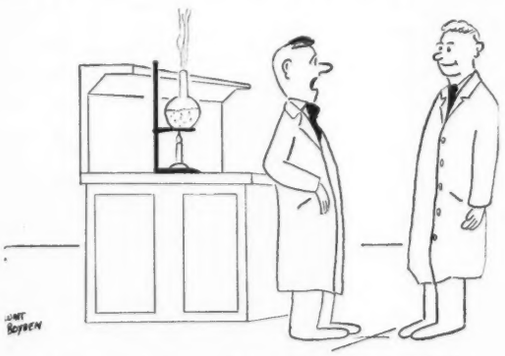
The supervisor occasionally learns as much about joint responsibility as do his men in an open exchange of ideas and experiences.

This type of discussion increases the opportunity of the management group to see performance as a team, or "we" effort, toward common objectives.

Finally, every person in a management position enhances his own advancement by helping his people to reach top performance, thus building management reserves for future needs.

The fourth step in the program provides for the development of programs of individual training based on the particular needs shown by an appraisal and a post appraisal interview. In developing these custom-tailored programs the line supervisors may call on any staff assistance they may require.

If a development program can help management men to discharge more effectively their responsibility, we should contribute more to the self-development of managers and the result should be that more and more of our people will be able to apply more of their creative energies to the enterprise.



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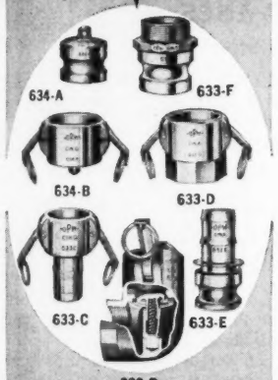

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Chemical Industry Progress

(*Continued from page* 11)

Gratifying as this unparalleled growth is, it places before us a rapidly growing set of problems and questions which must be answered if it is to continue. Of course, while these problems range all the way from technical manpower shortages to community relations, some of the most pressing ones are in the broad fields of sales and marketing.

Although rather shopworn, the phrase, "I'd rather own a market than a mill", would seem to explain a great deal of the current activity. More and more companies are becoming aware of the attraction of stabilizing sales and profits through greater control of end-product outlets. There is security in a marketing know-how situation and a market franchise comparable with the traditional security of a raw material or a know-how position in the production of basic intermediates. The insecurity of patent and know-how positions is becoming progressively more acute with the great expansion of technical research over the entire broad front of our industry.

Since the war all of us have seen improved salesmanship, more aggressive advertising, harder selling generally. The increased competition from other industries, and the selling concepts these newcomers have brought with them, have stirred the chemical industry to greater selling efforts. In general this has been good for the industry and, like it or not, it will continue.

And these shifting boundaries cannot help but force the whole of chemical management to be increasingly realistic in assessing their position in the industry. Mergers can change the nature of competition overnight, patents aren't the protection they used to be. And other industries certainly have no hesitancy about rushing, unheralded into the chemical business. All these factors leave no room for complacency.

Expanding companies will be forced . . . more as time goes by . . . into developing in the areas in which they have a superior position by reason of raw materials, patents, production know-how, and, emphatically, markets.

Yet, at the same time, companies, must remain flexible and not be bound by traditional concepts of what is or is not their field of operation. The organization that is quick to see . . . and grasp . . . an opportunity for development in logical new directions will be the company which will move forward most quickly in the years to come.

While the industry is the recognized leader in the fields of scientific and product research, it has lagged and is just now beginning to catch up in the field of market research. And progress in market research must be made quickly for at least two basic reasons.

First, the very magnitude of the industry in the

(*Please turn to next page*)

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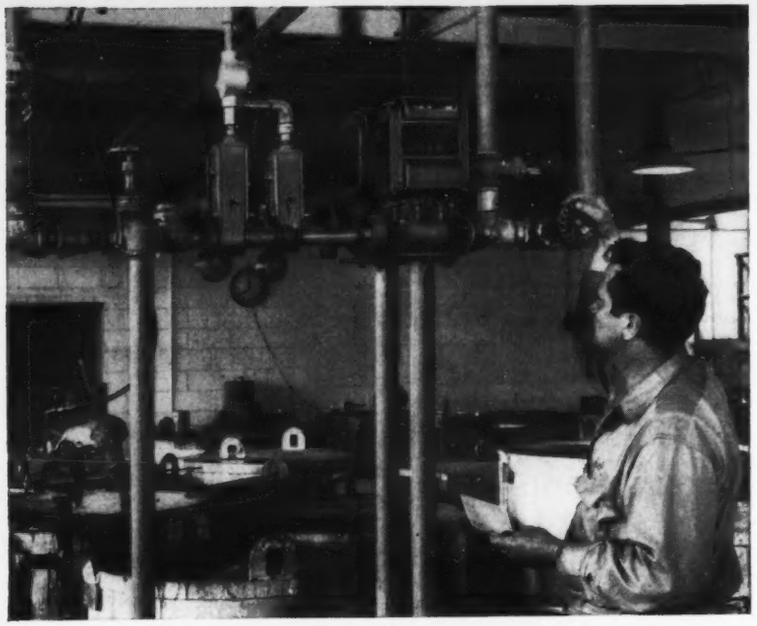

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Chemical Industry Progress

(*Continued from preceding page*)

next years will call for a more careful analysis of the markets as the great mass of chemical products become available. We'll be working in unfamiliar areas a lot of the time and a thorough examination of the markets will be essential. And second, the continued move into the consumer field pits us against competition which is already well along in the techniques of market research. And, indeed, the industry can learn a lot from this competition.

While the changing boundaries of the industry bring us additional competition, they also bring more customers. Companies which undertake the making of chemical products almost invariably become buyers from other chemical makers. Economists have long been perplexed by the way competition works in the chemical industry for it is not at all uncommon for a chemical firm to find its strongest competitor high up on the list of customers.

But, there is economic logic behind the fact that products seem to move back and forth between companies so freely. No company has a monopoly on all process know-how. One is better equipped and technically qualified than another to operate a particular manufacturing operation. Therefore, entry into the chemical field by the petroleum and rubber people has the effect of creating new customers for chemical companies despite opinion in some quarters to the contrary.

Yet, these new sales opportunities will set the tone for an even broader view of sales methods. A further and continued decentralization of the sales organization must follow the changing field. As the industry reaches further out into new areas, searching for jobs that can be done chemically rather than mechanically (herbicides replacing cultivating, resins improving mechanical spinning of fibers), sales organization must be able to cope with many different situations in many different industries. For the same reasons, chemical management in the future will need a broader knowledge of the whole of American industry.

The growth rate and operating profitability of the most progressive and aggressive chemical companies is not likely to degenerate despite the broaching of inter-industry walls. Whereas the newer entrants to the chemical field must, for the most part, be satisfied with the manufacture of already-known products, the chemical majors will continue to create new products, some of which will in turn create vast new markets. In an era of automation when human effort is being replaced by electronic and mechanical devices, there is ample opportunity for chemical products to fit into this pattern. There will be an ever increasing flow of such products from the laboratories and pilot plants of chemical companies. It will be on this base that continuation of the industry's growth trend will depend.

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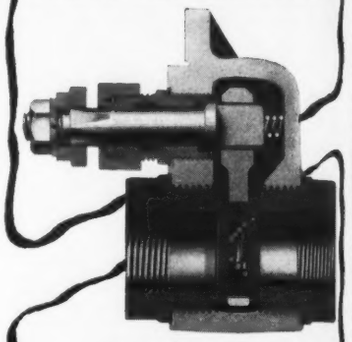

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Discussed in This Issue - - -

PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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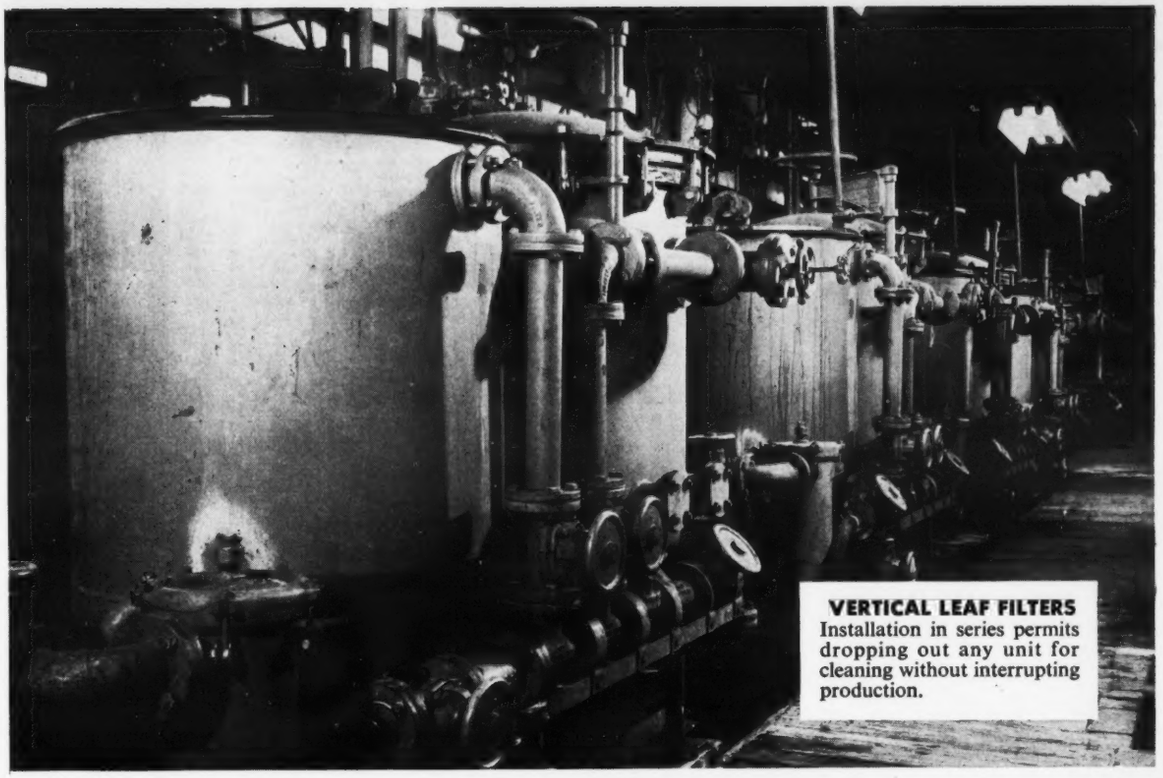

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For full data ask for Bulletin III

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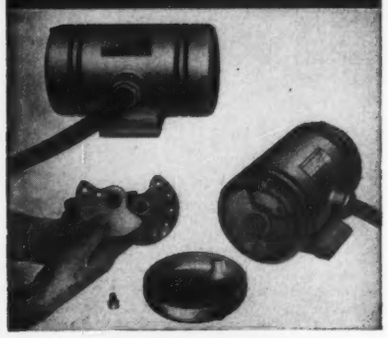

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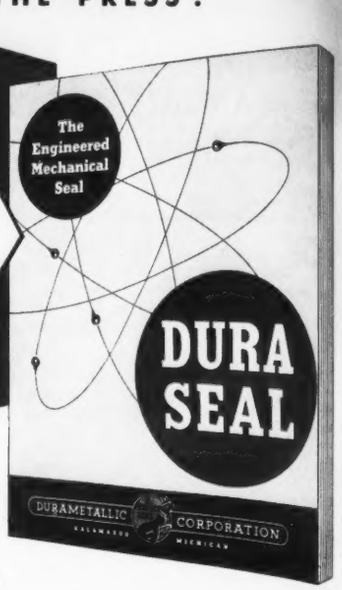

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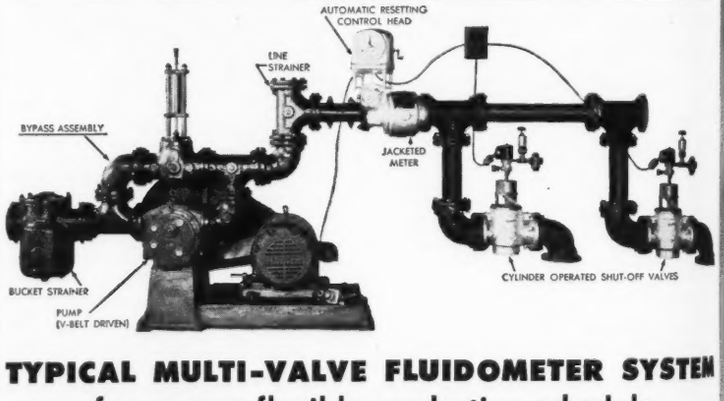

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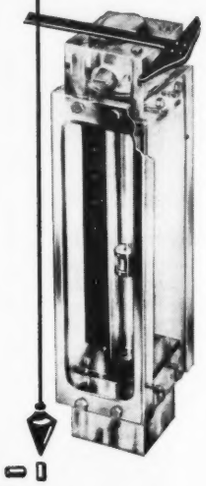

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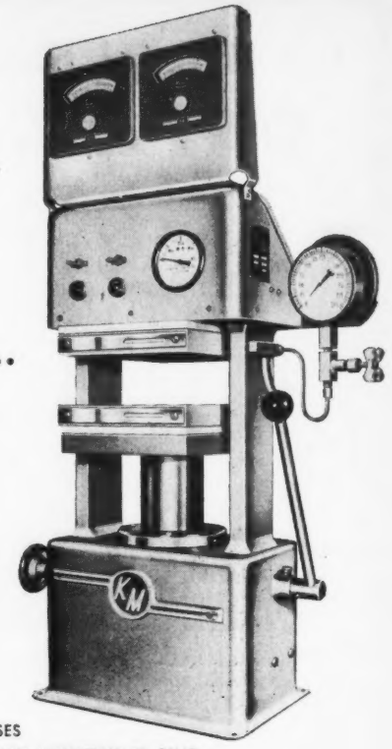
Manually operated 20 ton press shown with special heat control units and test gauge.



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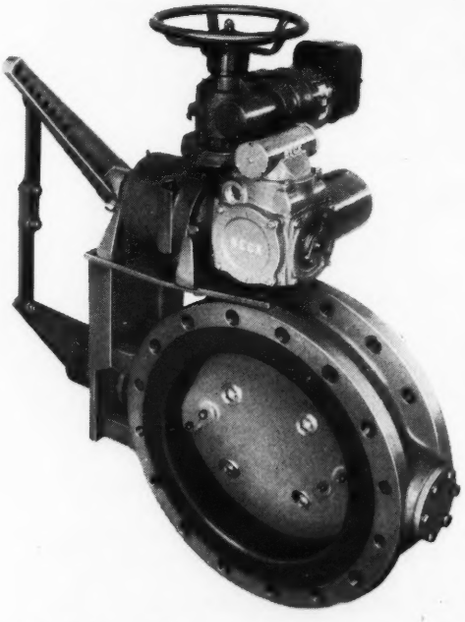

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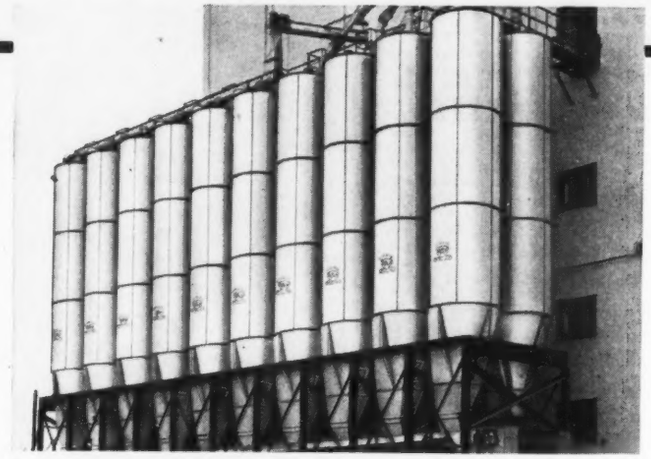

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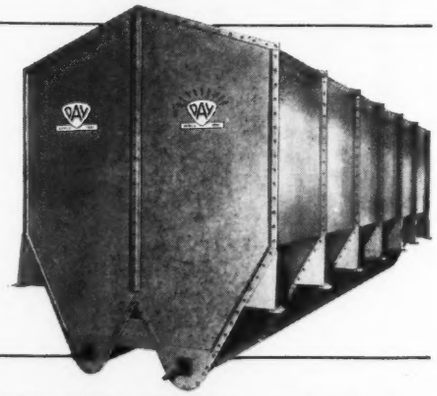

For detailed information on bulk material storage tanks and pneumatic conveying equipment to suit your production and storage needs, write toDAY for Bulletins 529 and 549.

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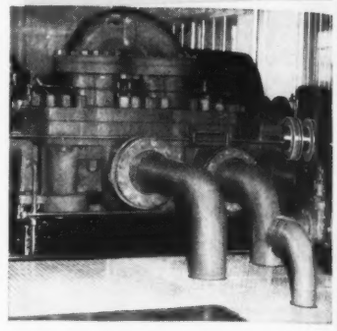

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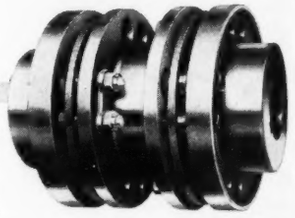

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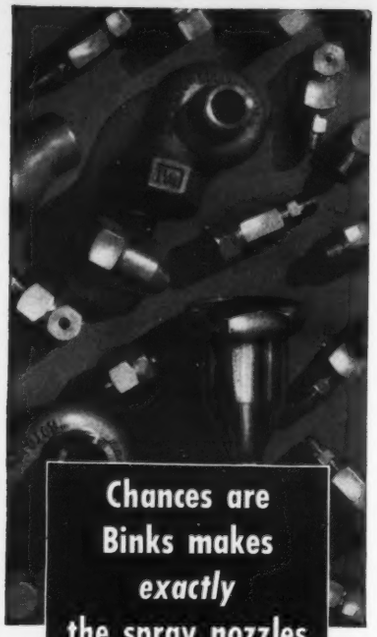

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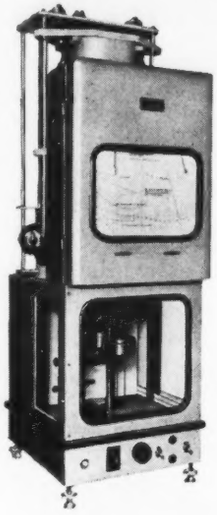

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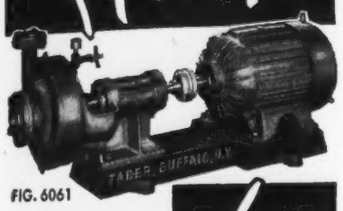

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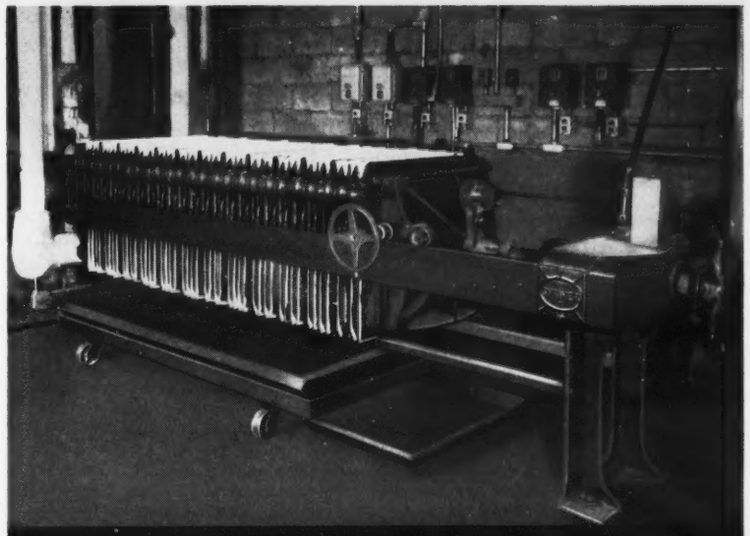

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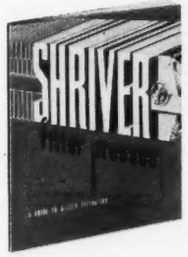

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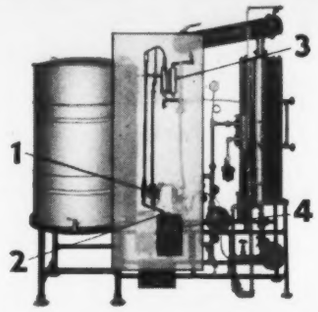

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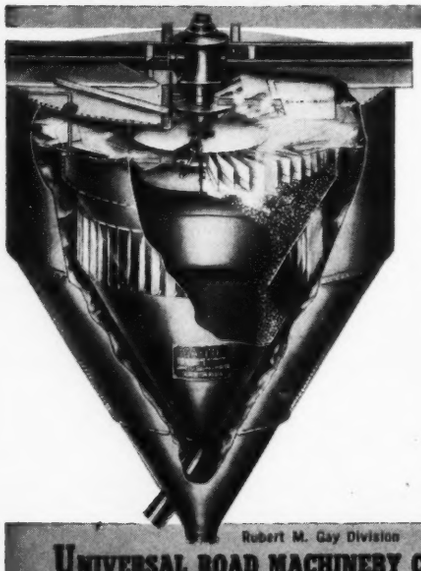

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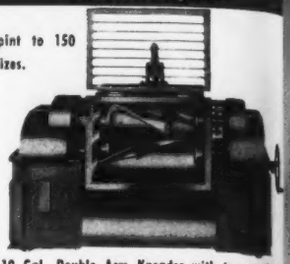

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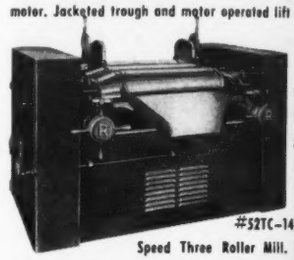

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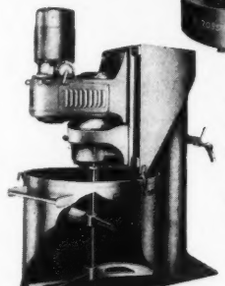

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- 1, 2, 3, 4, 6, 15, 25, 50, 65, 85, 110 and 150 gal. sizes.

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Brooklyn 5, New York

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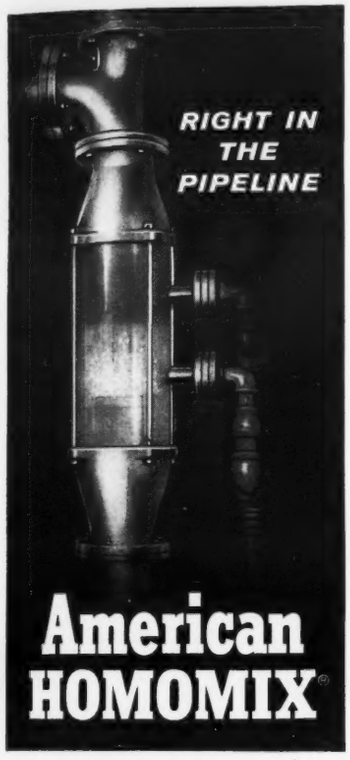

American HOMOMIX®

Gives instant, uniform, complete mixing
without a mixing tank

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)

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AMERICAN WELL WORKS
Mixing, Pumping, Water & Waste Treatment Equipment
150 N. BROADWAY, AURORA, ILLINOIS
Sales Offices: Chicago, New York, and other principal cities

When inquiring check 2579 opposite last page

What is Your DEMINERALIZED WATER PROBLEM?

This 30 gallon per hour, four-bed demineralizer has exceptional purifying capacity — provides a longer operating cycle before regeneration becomes necessary.

Above . . . Model FR-1, four-bed demineralizer. Flow rate 30 gph. Stainless steel encased. Requires only 28" x 24" x 56" floor space. Completely assembled. Requires only water, drain, and low-voltage electrical connection. Ideal for raw water of high mineral content since it will produce about 3 times the quantity of demineralized water per operating cycle as corresponding two-bed models.

There are thousands of uses for low-cost demineralized water in industry . . . and for all of these applications Barnstead Demineralizers can be used profitably, to reduce rejects, increase production, and insure better product results. Barnstead Demineralizers have capacities from ½ to 500 gallons per hour and feature single-bed, mixed-bed, two-bed, and four-bed models . . . a demineralizer for every need.

NEW!
CATALOG 127-A
Describes Barnstead's complete line of demineralizers. Gives specifications . . . case histories.

Pure Water Since 1878

Barnstead
STILL & DEMINERALIZER CO.
66 Lanesville Terrace, Boston 31, Mass.

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YOUR PUMPING JOBS
start fast
and finish fast
WITH VIKING PUMPS

WHEN you install Vikings, there's no wasted time with slow, uncertain priming . . . you start delivering in seconds. Delivery is then smooth and constant. There's no spasmodic operation to cause damage to valves and meters. And to finish, you can strip a tank fast and completely with positive Viking Rotary Pumps. They are built to pump all liquids, thick to thin.
To start, send today for pump catalog 57Scc.

VIKING PUMP COMPANY
Cedar Falls, Iowa, U.S.A. In Canada, it's "***ROTO-KING***" pumps
See our catalog in Sweets

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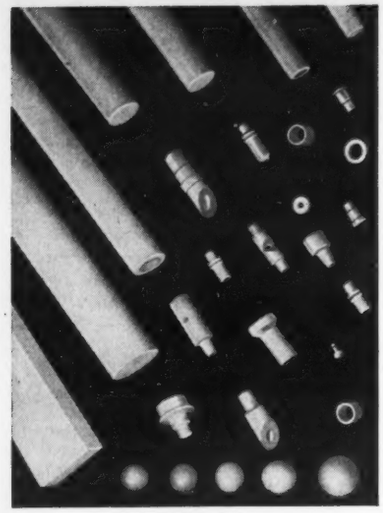

WHY teflon * MAY SOLVE YOUR PROBLEM

Check These Properties

CHEMICALLY INERT
Completely unaffected by acids, alkalies and solvents — all chemicals except molten alkali metals and fluorine.

HEAT RESISTANT
Continuous service up to 500° F.

LOW TEMPERATURE TOUGHNESS
As low as —320° F.

NON-ADHESIVE PROPERTIES
The tackiest of materials show little tendency to stick to Teflon.

EROSION RESISTANT
Resists erosion by impinging fluid to a high degree.

LOW CO-EFFICIENT OF FRICTION
Either against itself or other materials.

ZERO MOISTURE ABSORPTION
Absolutely weather resistant.

DIELECTRIC PROPERTIES
At high temperatures and frequencies.

WE CAN OFFER PROMPT DELIVERY ON **Sheet • Tape • Rod • Tube • Special Machined and Molded Parts, Spray Coatings • Mechanical Packings**

*DuPont trade-mark for tetrafluoro-ethylene resin

for teflon it's FLEXROCK PHILADELPHIA 1, PA.

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☐ We are enclosing sample, specs, and quantity for our TEFLON requirements. Please furnish quotation.

☐ Please send us your TEFLON Bulletin Including stock list.

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Company .....

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City ..... Zone ..... State .....

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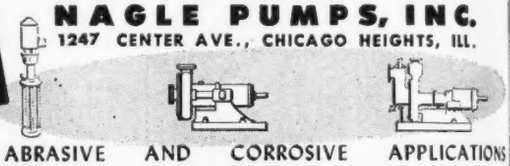
it takes a good pump to keep a good friend!

Nagle® Pumps are good pumps and have many good friends in industry. Typical is Behr-Manning Corp. Division of Norton Co. Abrasives is their business. Four Nagle abrasion-resistant pumps are in service at their plant shown above. The first, installed in 1946 in their boiler house, handles clinker laden water—a severe service.

NAGLE PUMPS are built for abusive applications only—abrasion, corrosion, heat, heavily loaded liquids, trash. Complete range of sizes—horizontal and vertical shaft types. Users re-order again and again on basis of performance. **SEND FOR CATALOG 5206.**

NAGLE PUMPS

NAGLE PUMPS, INC.
1247 CENTER AVE., CHICAGO HEIGHTS, ILL.



PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

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REPAIR FACTORY FLOORS
WITH THIS...

INSTANT SETTING PATCH!

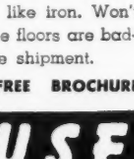
Repair broken factory floors without usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamp smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete—right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

MAIL COUPON for TRIAL OFFER and FREE BROCHURE

INSTANT-USE

FLEXROCK COMPANY (Offices in principal cities)
3611 Filbert St., Philadelphia 1, Pa.

Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to Co. letterhead).



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To get more information on products—use the Reader Service slip • *opposite this page*

ump
friend!

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talled in 1946
service.
abrasion, cor-
ge of sizes—
in and again

INC.
GHTS, ILL.

APPLICATIONS

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PROCESSING

THAT'S INTERESTING

(Continued from page 2)

Showers for ships

High-impact vinyl plastic pipe with solvent-welded fittings make possible a lightweight, long-lasting wash-down system to protect Navy ships from contamination by radioactive fall-out.

Cleansing spray, drenching all exterior surfaces above water line, makes it possible for ships to continue in action without exposing men to lethal radioactive particles. A crew of 10 can install complete system on a large carrier in two weeks.

Just a puff of smoke

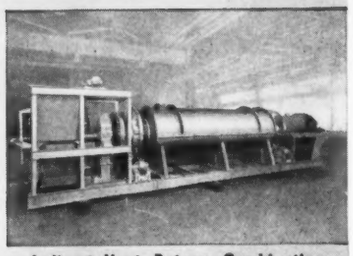
Approximately 15 billion particles of material are in an average puff of unfiltered cigaret smoke. Armour Research Foundation chemists found that:

- Puffs averaged from two to six milligrams in weight.
- Particles ranged in diameter from about 1.2 to 1.75 microns.
- Particles were predominantly liquid droplets of an oily nature.

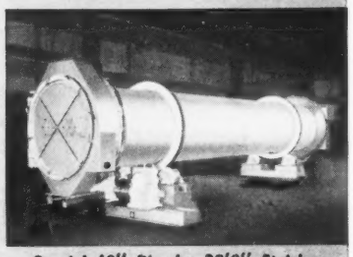
Hard cash

A stainless steel check in the amount of $1000 was recently presented to John Hancock Callender, architectural consultant, as an award sponsored by Allmetal Screw Products Co. Award was made for his article, "The Design of Stainless Steel Curtain Walls".

For more information on product at right, specify 2585 . . . see information request blank opposite last page.



Indirect Heat Rotary Combination Calciner and Cooler for Processing Catalyst in Hydrogen Atmosphere.



Special 60" Dia. by 32'0" Stainless Steel Dryer for Processing Plastics without Color Contamination.

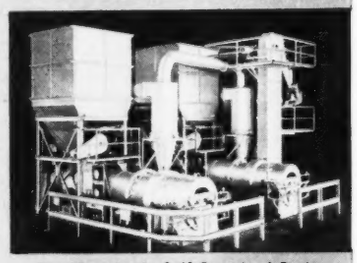
FROM

Anti-Biotics

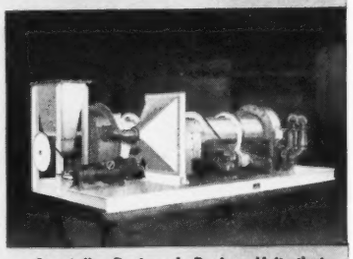
TO

Zirconium

Call BARTLETT-SNOW'S experienced specialists on every drying and heat processing problem



Two Completely Self-Contained Drying Systems Operated Singly or Together—Showing Materials Handling and Dust Collection Facilities.



Specially Designed Drying Unit that Removes Organic Solvent from Newly Developed Antibiotic.

Whether the material you wish to process is light or heavy, fine or coarse, abrasive or corrosive, we can design and build the exact size and type of equipment best suited for your particular product and capacity requirements.

Our wide experience and proven mathematical approach enables us to determine accurately the heat sensitivity, permissible temperatures, entrainment losses, desirable velocities, balling, sticking, cooling and all other chemical and physical aspects. Material can even be test run in our fully equipped heat processing laboratory, and samples of the finished product produced before the production equipment is designed or built. Let us work with you on your next job. We can handle any project including the complete materials handling and dust collection facilities. This assures fixed unit responsibility; the smooth, synchronized operation of all parts of the installation and utmost economy and satisfaction.

DESIGNERS ENGINEERS

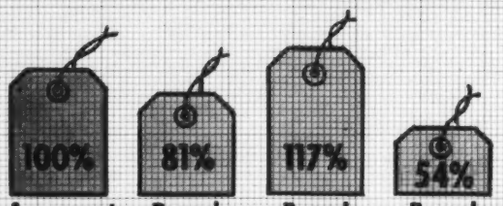
BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS ERECTORS

DRYERS • COOLERS • CALCINERS • KILNS — *Complete Facilities Including Materials Handling*

YOU CAN'T KNOW
what the real price tag is...

How price per gallon compares on leading vinyls



UNLESS YOU
compare mil sq. ft. per gallon and...

Sq. ft. coverage per gallon, 1 mil thick

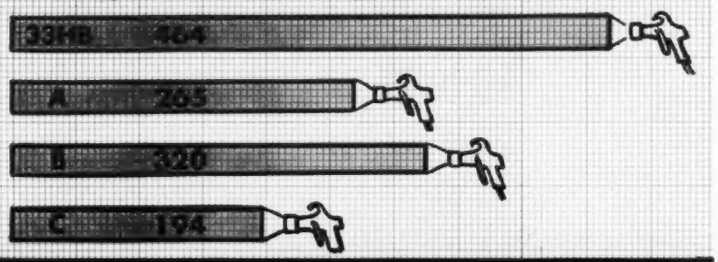
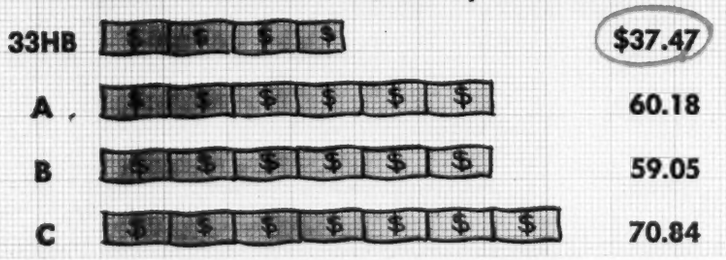


FIGURE THE
material cost of each coating, then get the...

		GALS.	COST
Needed to coat 250 sq. ft. 5 mils thick	33HB	2.68	$17.37
	A	4.72	24.78
	B	3.91	29.72
	C	6.44	22.54

REAL COST
by adding labor for the number of coats needed.

Labor & material cost, 250 sq. ft. x 5 mils thick



SERIES 102

Announcing...

A True High Build Vinyl Coating

Amercoat 33HB now gives you even *more* "mils per gallon" —and at the lowest cost of any leading vinyl!

At last, the two major limitations of vinyl protective coatings—critical adhesion and low film thickness—have been largely overcome. Amercoat 86 Primer stopped adhesion troubles, eliminated underfilm corrosion and undercutting, and simplified surface preparation. *Now Amercoat 33HB Topcoat builds thick films in fewer coats at surprising savings.*

Amercoat 33HB is a "high-build" version of Amercoat 33, the standard of the protective coatings industry for over ten years. 33HB gives you the same high resistance to corrosive chemicals, severe weathering and abrasion, *plus 33% greater thickness per coat!*

The solids content of 33HB tops all other non-mastic vinyl coatings, yet workable viscosity is retained. It applies smoothly and easily by hot or cold spray. No need to stock two types of materials.

New Lower Cost

In evaluating any coating, always look at the cost per square foot, and the number of coats required to build proper film thickness. 33HB is nearly 24% cheaper per mil square foot than traditionally low cost 33...and compared to other leading vinyls, (see chart) savings are even greater. For example, although the gallon price of Coating "C" is 46% lower than 33HB, because of its low solids content the actual *material* cost for 5 mils thickness is almost 30% higher than 33HB, and the applied cost, (labor and material) is almost 90% higher.

For the full story, send coupon for data on 33HB and detailed cost comparison of the four coatings on the chart.

Amercoat® CORPORATION
4809 Firestone Blvd. · South Gate, Calif.

AMERCOAT Corp. Dept. PC
4809 Firestone Blvd.
South Gate, Calif.
Please send me full information on Amercoat 33HB

Name_____
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Company_____
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City_____ Zone____ State_____

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